Comparing Interprofessional Socialization in Mixed Discipline and Nursing Student only Cohorts

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COMPARING INTERPROFESSIONAL SOCIALIZATION IN MIXED DISCIPLINE AND NURSING STUDENT ONLY COHORTS

by

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ABSTRACT
COMPARING INTERPROFESSIONAL SOCIALIZATION IN MIXED DISCIPLINE AND NURSING STUDENT ONLY COHORTS

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A main cause of patient safety incidents are avoidable failures in communication between health professionals. In response, healthcare has entered an era of interprofessionalism in education and patient care. A challenge to substantiating the value of interprofessional education (IPE) has been a limited number of studies that assess the effectiveness of IPE interventions compared to education interventions in which professions were learning separately from one another. This research project helps fill this gap and measures the differences in student interprofessional socialization (IS) between an IPE cohort and a usual care group of one-discipline learners. The purpose was to compare IS in mixed discipline and single discipline only student cohorts and to determine if mixed-discipline students demonstrate greater improvement in IS compared to single-discipline cohorts of students. Statistically significant increases in IS were seen with all participants, in individual cohorts and in all IS subscales both with all participants and individual cohorts. No difference was observed between a cohort of nursing student only learners versus a cohort of mixed discipline students. The study demonstrates that IS can be significantly increased through well designed learning in teamwork and collaboration whether students participate with single discipline peers or mixed discipline settings.

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CHAPTER 1

Problem/Significance to Nursing

The costs of patient harm are extraordinary. There are immense personal costs to the patient, their family and the healthcare team. Estimates vary, but one in ten patients have been reported harmed during hospitalization (Tingle, 2017). Adverse events are estimated to be the 14th leading cause of morbidity and mortality in the world (Slawomirski, Auraaen, & Klazinga, 2017). A main cause of patient safety incidents are avoidable failures in communication between health professionals (Tingle, 2017) and about half of medical errors are considered to be preventable (Freytag, Stroben, Hautz, Eisenmann, & Kammer, 2017).

In response, health care has entered an era of interprofessionalism in education and patient care. Interprofessional teamwork and communication improve patient outcomes and safety (Donchin et al., 1995; Manojlovich & DeCicco, 2007). The effects of poor communication and decreased collaboration between healthcare providers have been well documented. Poor communication and collaboration lead to increased risk of medical errors, decreased nursing job satisfaction, decreased patient satisfaction and poorer patient outcomes (Knaus, Draper, Wagner, & Zimmerman, 1986; Manojlovich & De Cicco, 2007; McCaffrey et al., 2012).

Most health profession education is currently delivered in a traditional, discipline specific way (Lapkin, Levett-Jones, & Gilligan, 2013). Each healthcare profession has discipline-specific educational programs, cultures, values and beliefs. This isolated approach can contribute to a lack of communication and collaboration among health

professionals (Hudson, Sanders, & Pepper, 2013). Though health professionals are tasked to perform cohesively on high functioning teams once in practice, interprofessional teams are not systematically educated together in patient care or teamwork skills (Institute of Medicine, 2003). Since this seminal Institute of Medicine (IOM) report, there have been increased efforts to design and implement interprofessional education (IPE) initiatives. The emphasis on IPE continues; a recent subsequent IOM report emphasizes the need to more effectively link interprofessional IPE with changes in collaborative behavior (IOM, 2015).

Interprofessional socialization (IS) is an important component of developing positive, collaborative interprofessional relations in healthcare delivery (Khalili, Orchard, Spence Laschinger, & Farah, 2013). As such, the attributes of IS should be included in the design of health care student education strategies to ultimately improve the functioning of health care teams. Programs that include IS efforts offer strategies to improve IPE design and ultimately, healthcare team performance and interprofessional relations (Bjorke & Haavie, 2006; DiVall et al., 2014). Research is needed to measure how the design of IPE impacts students' IS and in turn how IS can be incorporated into IPE to improve collaborative outcomes.

Though IPE is widely seen as a strategy to improve the ability to equip health profession students with the knowledge, skills, and attitudes necessary for effective team based care (Lapkin et al., 2013); designing, implementing, evaluating, and disseminating interprofessional education carries significant costs. Barriers to IPE implementation include scheduling challenges, difficulty in matching students of compatible level, limitations in faculty and staff time, insufficient funding, and inadequate administration

support (Abu-Rish et al., 2012). Therefore, persuasive evidence is needed to justify the need for IPE.

Despite the fact that the number of studies focusing on IPE has grown since the IOM's 2003 report, the evidence demonstrating outcomes from interprofessional initiatives is underwhelming. The literature illuminates several reasons for this. First, though the goal of IPE is to enable collaborative practice, there is a lack of attention in IPE to issues of power, conflict, and resolution strategies. IPE educators do not meaningfully address these issues (Paradis & Whitehead, 2015). Incorporating attributes of IS in IPE initiatives can offer strategies for addressing systematic biases and promoting deeper behavior change.

Another challenge to substantiating the value of IPE has been a limited number of studies that assess the effectiveness of IPE interventions compared to education interventions in which the same professions were learning separately from one another (Reeves et al., 2010b). In fact, one systematic review found no studies where researchers were able to assess the effectiveness of IPE interventions compared to education interventions where disciplines engaged in learning separately (Reeves et al., 2010b). Instead, IPE has been deemed effective with IPE interventions compared to control groups that received no educational intervention. Therefore, additional study is needed to establish IPE efficacy beyond comparing knowledge, skills, or collaborative attitudes for an interprofessional group to a group of students who received no planned learning or intervention. IPE outcomes need to be compared between mixed-discipline learners receiving an IPE intervention and a group of single-discipline students learning principles of collaborative teamwork as part of their professional training or usual care. This

research proposal helps fill this gap noted in systematic reviews of IPE initiatives and proposed to measure the differences in student IS between an IPE cohort and a group of one-discipline learners.

The research project builds upon the existing work conducted by IPE researchers. The unique areas of new contribution are as follows: the research project is founded on the role of the emerging concept of IS. Further, the research tested a component of the concept analysis model of IS: the primacy and necessity of experiential learning to increase IS. In addition, the literature identifies a need for research to assess the effectiveness of IPE interventions compared to education interventions in which the same professions were learning separately from one another. This research project compared an IPE learning to a usual care control of single discipline learners in the same content and structure.

Study Purpose and Aims

The purpose of this research project was to compare IS in mixed discipline and single discipline only student cohorts. Mixed discipline cohorts are those consisting of learners from a variety of programs of study. The aim of the proposal was to determine if mixed-discipline students demonstrate greater improvement in IS compared to single-discipline cohorts of students. This project made an original contribution to the educational preparation of nursing and other health profession students. Health care students from all disciplines need to be prepared to engage in collaborative, team-based health care because health team communication and collaboration impact patient outcomes. Educators need to understand if students value the contributions and role of interprofessional team members differently when they learn about providing team-based

care in a cohort of learners from their own discipline versus with a cohort of mixed discipline peers.

Specific Aims/Hypotheses

There were two specific aims and corresponding hypotheses for this research project:

1. Does participating in an educational session that includes teamwork and collaboration principles improve students' IS?

   Hypothesis: Students will demonstrate greater IS after learning teamwork and collaboration principles.

2. Does a mixed-discipline group of students demonstrate greater improvement in IS compared to a single discipline group of students?

   Hypothesis: Mixed-discipline students will demonstrate greater improvement in IS compared to a single discipline student group.

CHAPTER 2

Review of the Literature

Introduction

This chapter will present a comprehensive review of the literature pertinent to the research study. The review of the literature begins with a discussion of the theoretical/conceptual framework for the research as well as the conceptual and philosophical underpinnings. A comprehensive review and critical analysis of the pertinent literature including recent as well as classic works will follow with critique of the primary research relevant to the study. A pilot study was conducted in preparation for the current study. Findings from the pilot study will be presented and discussion will include how results of the pilot study informed the current project. Assumptions of the study will be addressed. The research questions and hypotheses to be tested will be discussed. Finally, a summary of gaps in the literature will be included with consideration given to how the study will address these gaps.

Theoretical Framework

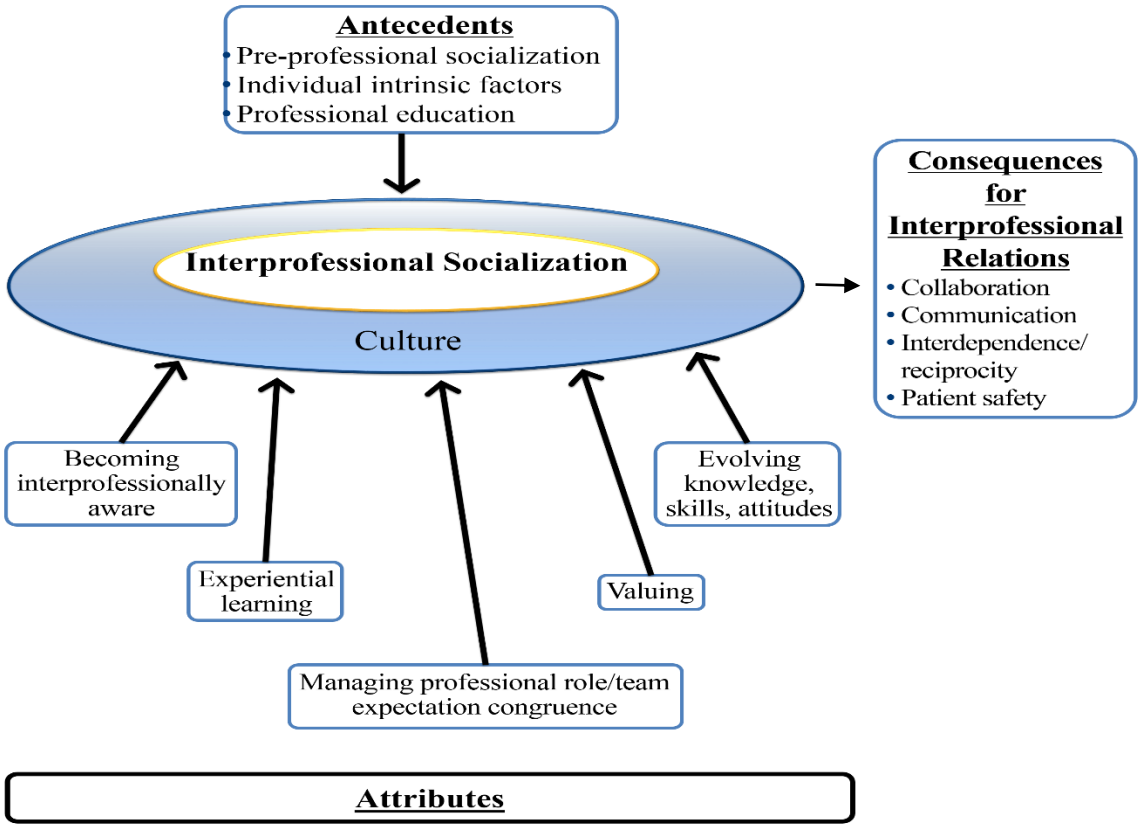
The emphasis on IS is a relatively new development and IS is neither well understood nor consistently incorporated into descriptions of professional or IPE. Effort is needed to define and clarify IS as a concept to ultimately utilize its full potential to improve interprofessional relations. An evolutionary approach is particularly salient to IS because it acknowledges that definition, evaluation, and refinement of a concept are influenced heavily by the social and cultural contexts within which it has been used over

time. A concept analysis using Rodgers framework was conducted as it values an evolutionary view (Rodgers, 2000).

There are six steps in Rodgers' method of evolutionary concept analysis. First the concept of interest and associated expressions including surrogate terms are identified. Second, the appropriate setting and sample for data collection needs to be selected and identified. Third, relevant data are collected to identify the attributes of the concept and the contextual basis of the concept, including interdisciplinary, sociocultural, and temporal variations such as antecedent and consequential occurrences. Next, the data are analyzed and results are interpreted. Finally, hypotheses and implications for further development of the concept need are identified. In practical application of this model, many of the steps are carried out simultaneously throughout the investigation (Rodgers, 2000). However, to facilitate transparency of the methodology, each step will be discussed separately.

Examination of articles identified attributes, antecedents, and consequences of IS. The results yielded a description of IS with five component attributes: building interprofessional awareness, experiential learning, managing professional role/team expectation congruence, valuing, and evolving knowledge, skills, and attitudes (Groom, first manuscript following chapter 3). Findings from the concept analysis are portrayed in the IS model, Figure 1. The resulting understanding of IS serves as the theoretical framework for this research study.

IS Theoretical Model



The first key finding was that data portray changes in the concept over time. One important contextual consideration is that IS emerged as different and separate from the concept of professional socialization (Dinmohammadi, Peyrovi, & Mehrdad, 2013). Historically earlier emphasis on professional socialization yields to sources richer in discussion of IS. A prior depiction in the literature was that of an individual's professional identity making a contribution to care as an autonomous and independent expert.

The description of an autonomous and independent professional being socialized to provide expert care begins to change. The representation of multidisciplinary,

professionally socialized care providers begins to give way to the import on valuing the contributions of other professions (Davies, 2002). Themes of dual professional and interprofessional identities begin to permeate the discussion of IS (Khalili, et al., 2013).

In addition, sources portray that IS happens in an interprofessional practice environment (Veerapen & Purkis, 2014). The context of the interprofessional environment has an important influence on the progression of development to the concept of IS (Veerapen & Purkis, 2014). Therefore, interprofessional practice within the culture of the organization and environment of healthcare delivery sets a crucial context for IS. Individual hospital and unit cultures will thereby impact interprofessional relations and may be such that they support or hinder IS. This is depicted by the contextual environment of culture surrounding IS in the pictorial representation of the concept, Figure 1. The organizational culture and subsequent formative early workplace experiences are important contexts that shape interprofessional attitudes (Veerapen & Purkis, 2014).

Several important antecedents to IS emerged in review of the literature. These antecedents are pre-professional socialization, individual intrinsic factors, and professional education (Khalili et al., 2013). Pre-professional socialization begins prior to an individual's professional education. Socialization to healthcare professions begins in childhood and is shaped by cultural and societal contexts (Khalili et al., 2013). Many students have developed an interpretation of their chosen career before entering their professional education; indeed this understanding may aid in selection of their area of study from between other competing and related professions (Khalili et al., 2013).

Beliefs acquired through pre-professional socialization input contain myths and prejudicial attitudes that need to be reformulated with IS. Unfortunately, these pre-professional, anticipatory beliefs are well-ingrained and formidable to overcome (Michalec, Giordano, Arenson, Antony, & Rose, 2013; Khalili et al., 2013). Pre-professional socialization may continue during an individual's professional education when the individual negotiates their identification with, opposition to, and fit within their chosen profession (Arndt et al., 2007).

A second antecedent to IS is professional education. Professional education is the discipline specific education and training an individual completes to practice in their discipline. Professional education refers to formal efforts to provide information and experience and develop new skills and competencies among students (IOM, 2003). Professional education extends beyond higher education curriculum and can include formal, on-the-job training efforts to provide information and experience to develop new skills and competencies. At the completion of their professional education, students will have mastered not only the skills and values of their profession but also its professional identity (Hall, 2005).

Challenges arise as a result of the current model of professional education delivery. Knowledge needed to provide safe patient care is complex. The complex skills required of health care providers has resulted in increased specialization in health care professions and few opportunities to interact with other professions during formal education requirements (Hall, 2005). Historically, this educational model has built and reinforced a siloed, separatist culture among health professionals (Hall, 2005). As a product of being educated separately, unintended consequences to interprofessional

practice have permeated. For example, differing terminologies exist when teaching interdisciplinary team skills, faculty and students struggle to understand other professions' core concepts and content (IOM, 2003). Instead interprofessional practice would benefit from a common language across health disciplines around core interrprofessional competencies (IOM, 2003).

There are several barriers to true IS imbedded in our current model of professional education. One such barrier is that professional socialization is emphasized rather than IS. Professional socialization affects the way different health professional groups view themselves. For example, physicians report themselves as team leaders and decision makers while other health disciplines such as nursing and therapists report themselves as team members (Baker, Egan-Lee, Martimianakis, & Reeves, 2011; Hall, 2005; Horsburgh, Perkins, Coyle, & Degeling, 2006). The nature of healthcare delivery often requires interprofessional team members to take both leader and member roles depending on the needs of the clinical situation.

Additional barriers embedded in our current model of professional education include closure and the rotational model of clinical experience. Professional groups engage in a process of closure to secure and protect areas of expertise and knowledge (Baker et al., 2011; Khalili et al., 2013). Closure is performed to secure turf zones in professional practice and appears to be deeply rooted in the professional socialization of healthcare professionals (Khalili et al., 2013). A final barrier embedded in professional education includes the rotational model of clinical experience. Frequent transitions may impede or delay adequate socialization and interprofessional relationships (Holmboe, Ginsburg, & Bernabeo, 2011).

Another antecedent to IS is individual characteristics. People bring with them personal factors intrinsic to the individual. These personal factors include interprofessional beliefs and behaviors and an individual's affinity for either an individualistic or collectivistic orientation (Khalili et al., 2013). A collectivistic orientation may predispose the individual to more readily accept and engage in interprofessional modalities.

The first attribute of IS is building interprofessional awareness. Building interprofessional awareness is centered on articulating the differences among professions, establishing and understanding of these differences, and determining where one fits in relation to other health care professionals (Arndt et al., 2009). The second attribute of IS is experiential learning. The shared, formative nature of experiential learning builds the collaborative values and attitudes needed in interprofessional teams. Therefore, in the conceptual understanding of IS it is evident that there is a primacy and necessity of experiential learning to achieve IS.

The next attribute of IS is managing professional role/team expectation congruence. Managing professional role and team expectation congruence is the extent to which an individual is successful in maintaining a collaborative interprofessional identity in their ongoing practice despite potentially conflicting demands and contingencies of the workplace (Veerapen & Purkis, 2014). The fourth attribute of IS that emerges in the literature is valuing. Valuing encompasses the individuals evolving appreciation and understanding of the import of a collaborative team approach (King, Shaw, Orchard, & Miller, 2010). Individuals must see meaning and worth in working with others and appreciate the benefit of an interprofessional approach to healthcare delivery. The final

attribute of IS evident through the literature review is evolving knowledge, skills, and attitudes. The purposeful selection of the term evolving reflects that the interprofessional team member must stay abreast and current in responding to the developing nature of team based care and the progress of advancing competencies.

Though recent effort has been directed towards designing, implementing, and testing the results of interprofessional education initiatives, relatively few of these interprofessional efforts directly and explicitly attend to learners' IS needs. Efforts at interprofessional education that do not address the socialization needs of team members may not be sufficient to change team dynamics.

Fortunately, barriers are present and significant but not insurmountable. Interprofessional education programs must include planned attention to IS to overcome imbedded barriers. Interprofessional education efforts should be designed to help students see meaning and worth in working with others and appreciate the benefit of an interprofessional approach to healthcare delivery.

The conceptual/theoretical framework of IS informs variables of interest selected for this design. Indeed, the research project begins preliminary examination of the proposed concept analysis of IS by investigating the IS attribute of experiential learning. The primacy and necessity of experiential learning to develop IS is tested by comparing mixed-discipline and nursing-only cohorts of students studying principles of collaboration to provide team-based care.

Philosophical Underpinnings

The philosophical underpinning of this research project is critical realism. Critical realism is a form of post-positivism. Critical realism posits that there is an independent

reality that science can study. Yet, critical realism theorizes that observation is fallible and can have error. Therefore, theories are revisable. Critical realism emerged as a wider attempt to harness the strengths and address the weaknesses of positivism, idealism, and relativism. It acknowledges the possibility of science but recognizes the social dimensions of humans and science (Clark, Lissel, & Davis, 2008).

The philosopher Roy Bhaskar proposed critical realism as a way to combine realist experimentation with an acknowledgement that research is conducted on, with, and by fallible people. Bhaskar's work criticized positivist accounts of the natural sciences that emphasized the existence of universal law-like explanations for phenomena and a view that research was based only on what could be observed (Clark et al., 2008). Not only is research conducted by people but it is housed within social structures and communities that wield influence and can distort the objective collection and measurement of data (Rolfe, 2006). Bhaskar's critical realism offers a framework that assists researchers in constructing an account of the world that is an interpretation of reality. Indeed, critical realism has a unique potential to frame the complex phenomena present in a health care system.

The ontologic foundations of critical realism are that there exists a world independent of human understanding and that there are underlying mechanisms that create events we can observe and experience. Epistemologically, critical realism posits that we do not have unmitigated access to this world. Instead, our knowledge is locally and historically placed. Yet, in critical realism there are grounds for choosing between competing theories and views. Science theorizes mechanisms that would explain our experiences and then conducts tests to confirm or deny the theory. Critical realism can

serve as a foundation for both quantitative and qualitative research because it values the features of our reality that are possible to quantify without asserting that only phenomena that can be known are those that can be reduced to a quantity (Schiller, 2016).

Critical realism's philosophic perspective supports a range of research methodologies since it recognizes the inherent complexity of phenomena and can underpin meaningful research in social and practice-based sciences such as nursing, social work, and education (Schiller, 2016). Critical realism has been applied to nursing research and is particularly useful for informing research related to understanding complexity and improving interventions. Critical realism therefore informs this exploration and research of complex interprofessional teams and education intervention strategies to improve healthcare team functioning. The research project tests components of the conceptual model of IS and in critical realism, the role of research is to build conceptual models and theories as a way of explaining those social phenomena that we experience (Schiller, 2016). The philosophical underpinning of the research project are well aligned to theorize mechanisms that would explain the concept of IS and then conduct tests to confirm or deny the theory.

Comprehensive Review of Literature

Multiple areas of literature were reviewed to frame this study and its research questions. First, a concept analysis of IS as presented above was conducted. Barriers to IS were researched. Research on IPE was explored with an emphasis on the current educational environment and online modalities. Gaps in the research were identified and informed the development of the research study.

The literature review will begin by discussing strategies for IS. Successful IS programs offer strategies to improve IPE design and ultimately, healthcare team performance and interprofessional relations (Bjorke & Haavie, 2006; DiVall et al., 2014). Interprofessional practice demands that healthcare professionals extend their professional socialization to embrace dual professional and interprofessional identities (King et al., 2010; Bartunek, 2011). IS enables team members to develop and embrace interprofessional identities beyond the professional identity developed in their education and training.

Strategies for IS. Strategies to enhance the IS experiences of health professional educators have been explored. An interpretive phenomenological study included 26 health professional educators to discover the phenomena of IS (Stanley, Dixon, Warner, & Stanley, 2016). This study utilized purposeful sampling to ensure representation of professions. Participants were self-selected by responding to an initial invitation. Interviews were completed face to face by the same researcher. A theme of IS strategies within higher education emerged in the analysis (Stanley et al., 2016).

The health professional educators in this study indicated that there was a lack of socialization preventing them from integrating to their faculty roles and further delaying collaborative work (Stanley et al., 2016). Participants offered a total of 100 suggestions for improving IS leading to 12 formal and informal strategies. The first strategy is for interprofessional leaders or representatives. Participants indicated a key individual is needed to connect faculty across diverse groups (Stanley et al., 2016). Next respondents noted a need for interprofessional workshops. These workshops would provide an environment for sharing teaching strategies and curriculum development across

disciplines (Stanley et al., 2016). In addition, a need for professional development opportunities was discussed. Though professional development opportunities already exist with in many institutions of higher education, it was noted to extend this type of programming to an interprofessional approach (Stanley et al., 2016).

Another strategy for improving IS of health professional educators is interprofessional orientation or induction. Study participants indicated that widening orientation to include all professions would foster an interprofessional environment (Stanley et al., 2016). Several study participants noted that co-teaching with faculty from other professions would enhance student learning experiences (Stanley et al., 2016). Another strategy was to facilitate interprofessional research or grant applications (Stanley et al., 2016). Interprofessional mentoring was included as a strategy to improve IS, as was joint curriculum planning (Stanley et al., 2016). Informal IS strategies included meet and greet opportunities, a common room or social environment for networking, attention to proximity of offices and online networking sites (Stanley et al., 2016). This study highlights that work is still needed to improve the IS experiences of faculty members as a precursor and facilitator to attending to student IS needs.

Barriers to IS. Understanding the barriers to IS can provide a much needed guide for health science educators and researchers to contribute to and advance the body of knowledge in IS and to develop more effective IS strategies. Barriers to IS have detrimental impact to vulnerable populations. The value of teamwork both to work environments and patient outcomes has been well-recognized in health care (World Health Organization, 2010). However, the historical context and social positioning of different health professions, in particular nursing and medicine, has produced barriers to

IS (Price, Doucet, & McGillis Hall, 2014). There has been focus on improving the nurse-physician relationship, yet nursing continues to be socially positioned as inferior to medicine, making nurses a potential vulnerable population (Price et al., 2014). Exploring and illuminating the barriers to IS, therefore, can help impact the vulnerable position of nurses in the healthcare workforce relative to their physician counterparts as well as positively impact patient outcomes.

The literature profile for exploration of barriers to IS yielded a balanced representation of discussion papers and qualitative and quantitative research. Three categories of barriers to IS emerged in the thematic analysis: historical power differentials and professional cultures, stereotypes, and educational environment. Each of these barrier categories will be presented and discussed in turn.

Current interprofessional attitudes and practice have been informed by the historical evolution and social positioning of nursing and medicine (Price et al., 2014). Part of this historical context has been gender differentials. In the industrial revolution, laws began to be passed that required medical professionals to pass examinations before practicing medicine. Although women were not excluded from taking the required examinations, they were typically excluded from the university education to prepare them for success on the exam (Hall, 2005). Even when not explicitly exclusionary, professionalization processes continued to develop with the aim of securing and protecting exclusive areas of expertise and knowledge (Khalili et al., 2013).

Historical analysis of the nurse-physician relationship yields several themes, most of which have proven adversarial. These themes are choosing one career over the other, knowledge wars, nursing as second best, nursing as morally superior, and collaborative

nurse-physician relationships (Price et al., 2014). When a health studies student chooses a career it is often a process of having considered perceived differences such as between nurses and physicians, making the professions paradoxically positioned (Price et al., 2014). A second historical theme is that of knowledge wars where physicians are placed at the top of the knowledge hierarchy (Price et al., 2014). A third historical theme is that of nursing as second best. Portrayals of nurses and physicians in media emulate this theme with nurses positioned as less central to patient outcomes (Price et al., 2014). A fourth historical consideration is that of nurses as morally superior. In trying to explain the important and unique contribution of nursing, nurses will use descriptors such as caring and holistic. Caring and holism become a moral platform upon which to defend the work of nursing (Price et al., 2014). A final more recent historical theme has been the emerging emphasis on the collaborative nurse-physician relationship. This collaborative relationship has been shown to improve quality of patient care (Aiken, Smith, & Lake, 1994).

Power differentials continue in contemporary practice. An exploratory analysis gauging the interprofessional environment in two clinical units found that physician centrality continues to hold sway. In this study, physician centrality was constructed by a subscale of items indicating whether an individual feels a physician should be the primary decision maker (Russell, Nyhof-Young, Abosh, & Robinson, 2006). A higher score indicated a stronger value towards physician centrality. Perhaps unsurprisingly, physician centrality scored significantly higher amongst physicians and medical students than compared to all other health professionals including nursing, social work, pharmacy, physical therapy, occupational therapy, speech language pathology, and nutrition who

favored a more collaborative, shared decision making approach (Russell, et al., 2006). An acknowledgement of these power differentials is important to consider if interprofessional efforts are to achieve a more collaborative outcome (Whitehead, 2007).

In addition, the professional cultures of each discipline-specific group serve as a barrier to IS. Each health care practice discipline has its own professional culture. A professional culture includes the values, beliefs, attitudes, customs, and behaviors of professionals in the discipline (Hall, 2005). As professions have struggled to define their culture, boundaries were erected to be exclusionary to other professions. The passing of professional culture from members to students takes form in both formal curricula and unspoken modeling. Challenges arise when bringing together professionals from these different cultures to perform as an effective interprofessional team.

One powerful barrier that emerged in the literature was stereotypes. Students enter health profession education with powerful negative perceptions of health disciplines other than their own (Michalec et al., 2013). This pre-professional socialization begins prior to an individual's professional education. Socialization to healthcare professions begins in childhood and is shaped by cultural and societal contexts (Khalili et al., 2013). Many students have developed an interpretation of their chosen career before entering their professional education; indeed this understanding may aid in selection of their area of study from between other competing and related professions (Khalili et al. 2013). Beliefs acquired through pre-professional socialization input contain myths and prejudicial attitudes that need to be reformulated with IS. Unfortunately, these pre-professional, anticipatory beliefs are well-ingrained and formidable to overcome (Khalili et al., 2013; Michalec et al., 2013).

Stereotyping does not cease to be a barrier once formal health profession education begins. Instead, disciplinary stereotypes can continue to be reinforced. Student interviews performed on two hospital clinical teaching units found that students had little understanding of the nature of collaborative behavior and appeared to learn their discipline's culture through tacit observations of staff behaviors (Russell et al., 2006). This can continue to reinforce existing stereotypes and pose a threat to true interprofessional relations.

Another interesting aspect of the stereotypes health care students convey is that individuals carry significant in-group favoritism (Michalec et al., 2013). Students consistently rate their own profession more favorably on a variety of skill subsets than how students from other disciplines rate their profession. The high in-group favoritism coincides with a high level of commitment to a student's chosen profession (Michalec et al., 2013).

Fortunately, there is some evidence that stereotypes can be impacted by IS and education. One study included student participants from multiple disciplines including medicine, nursing, occupational therapy, physical therapy, dental hygiene, pharmacy, and dentistry. Researchers found participants had low baseline scores of some professions, such as independence for nurses or being a team player for physicians (Ateah et al., 2011). Following interprofessional interventions including IPE and immersion experiences, perceptions changed significantly (Ateah et al., 2011).

The current education environment is one that continues to emphasize professional-centered education. Professional education is the discipline specific education and training an individual completes to practice in their discipline. Professional

education refers to formal efforts to provide information and experience and develop new skills and competencies among students (IOM, 2003). Socialization to healthcare roles continues during an individual's professional education when the student negotiates his/her identification with and fit within the chosen profession (Arndt et al., 2009). Professional education extends beyond higher education curriculum and can include formal, on-the-job training efforts to develop skills and competencies. At the completion of their professional education, students will have mastered not only the skills and values of their profession but also its professional identity (Hall, 2005).

Challenges arise as a result of the current model of professional education delivery. Knowledge needed to provide safe patient care is complex. The complex skills required of health care providers has resulted in increased specialization in health care professions and few opportunities to interact with other professions during formal education requirements (Hall, 2005). Historically, this educational model has built and reinforced a siloed, separatist culture among health professionals (Hall, 2005). As a product of being educated separately, unintended consequences, such as stunted team communication, have permeated (Hudson et al., 2013).

There are several barriers to true IS imbedded in our current model of professional education. One such barrier is that professional socialization is emphasized rather than IS. Professional socialization affects the way different health professional groups view themselves. For example, physicians report themselves as team leaders and decision makers while other health disciplines such as nursing and therapists report themselves as team members (Hall, 2005; Horsburgh et al., 2006; Baker et al., 2011).

Additional barriers embedded in our current model of professional education include closure and the rotational model of clinical experience. Closure is described as a process of securing and protecting areas of knowledge and regulating professional entry and work practices to maintain economic, social, and political advantage (Baker et al., 2011). Closure appears to be deeply rooted in the socialization of healthcare professionals (Baker et al., 2011; Khalili et al., 2013). Having worked hard to maintain exclusivity, professional cultures must now be re-examined and balanced with the importance of interprofessional identities. A final barrier embedded in professional education includes the rotational model of clinical experience. Frequent transitions may impede or delay adequate socialization and interprofessional relationships (Holmboe et al., 2011). Qualitative data on the experiences of medical, nursing, and other health professional students participating in the rotational model of clinical education echoes this impediment in IS. One medical student narrative report exemplified this challenge: "they really don't know who I am. … It seems like people don't want to spend the time to get to know everybody … I almost feel that I am jutting into their team and then I am gone" (Russell et al., 2006, p. 34).

Another component of the barriers imbedded in the educational environment is the attitudes of health sciences faculty members towards interprofessional teamwork and education (Curran, Sharpe, & Forristall, 2007). In one survey of diverse health science faculty, the profession and gender of the faculty member as well as their prior experience with interprofessional education were related to faculty attitudes towards interprofessional education (Curran et al., 2007). In this group, the mean score of medicine faculty towards interprofessional health teams was significantly lower than

nursing faculty (Curran et al., 2007). In addition, female medicine faculty and medicine faculty who had prior experience with interprofessional education had significantly higher attitude scores than their male counterparts and those who had no experience in interprofessional education (Curran et al., 2007). Therefore, consideration may also need to be given to changing faculty attitudes towards interprofessional socialization and education.

Continuing education programming is also not immune to IS barriers. The IOM report *Redesigning Continuing Education in the Health Professions* (2010) highlighted the vital role continuing education after professional education to increase interprofessional skill sets. Barriers identified in this setting include limited awareness of each health care team members' knowledge, skills, and abilities (Owen & Schmitt, 2013). Attention should be given to interprofessional barriers at the individual, team, and organization level when planning continuing education to improve interprofessional teamwork (Owen & Schmitt, 2013).

Where formal IS and education initiatives are not in place, interprofessional practice is left to ad hoc observations of the behaviors of preceptors and staff in multidisciplinary environments (Russell et al., 2006). When such clinical environments are less than optimal, future health care professionals are influenced by the attitudes and behaviors they observe.

Though recent effort has been directed towards designing, implementing, and testing the results of IPE initiatives, relatively few of these interprofessional efforts directly and explicitly attend to learners' IS needs. Efforts at IPE that do not address the socialization needs of team members may not be sufficient to change team dynamics.

Yet, even when IS is attended to, significant barriers remain to creating a truly interprofessional identity. Socialization of students to profession-specific roles, values, and cultures has been occurring since the onset of professional training. IS on the other hand, is a relatively new concept, gaining increased coverage in the literature in the last 15 years. Not only is IS a recent emphasis, IS also faces ingrained and powerful barriers. Illuminating these barriers is a crucial first step to making headway towards IS. The barriers of traditional stereotypes, power differentials and professional cultures, and the nature of the educational environment exist not solely as a historical context but remain a current challenge as well.

Fortunately, barriers are present and significant but not insurmountable. IPE programs must include planned attention to IS to overcome imbedded barriers. IPE efforts should be designed to help students see meaning and worth in working with others and appreciate the benefit of an interprofessional approach to healthcare delivery. At the most cursory level, positive messaging about the value and contribution of all members of the health care team is needed to negate historical stereotypes (Price et al., 2014). In addition, interprofessional knowledge, skills, and attitudes must be developed. These interprofessional competencies are not static; they are a set of tools that can be learned, developed and fostered. Since IS barriers are encountered in anticipatory socialization, professional education, and practice environments, IS and education efforts should span pre-professional education, practice environment and continued education offerings.

Future research initiatives should be focused on targeting and overcoming each of the identified barriers to IS. For example, strategies for overcoming stereotypes have been identified. One such strategy is interprofessional immersion experiences (Ateah et

al., 2011). Interprofessional experiences provided to students in both the education and clinical settings are shown to be sufficient to demonstrate improvement in health care education students' perceptions of various professions and overcoming anticipatory stereotypes (Ateah et al., 2011). A thoughtful approach to IS that includes recognition of barriers is formative to foster the interprofessional competencies required for collaborative interprofessional care.

IPE

An emphasis on IPE was ignited following seminal works in the patient safety movement. Beginning with *To Err is Human,* (IOM, 1999) attention was given to the critical number of patients harmed from preventable medical errors. Focus was given to the role of human factors in medical errors. A human factors approach was encouraged to help understand where and why systems or processes were breaking down and causing medical harm. The human factors discussion emphasized designing better systems and processes and improving communications and coordination within teams (IOM, 1999).

There continued to be an emphasis on improving patient safety through team cooperation, collaboration, and communication. The increased focus on team training led to the development of core competencies for healthcare students that highlighted the importance of working in interdisciplinary teams (IOM, 2003). The mandate became that all health professionals should be educated to deliver patient-centered care as a member of an interdisciplinary team (IOM, 2003) and IPE emerged as a predominant strategy in health professional education.

The World Health Organization (WHO) has affirmed a commitment to IPE with its Framework for Action on Interprofessional Education and Collaborative Practice

(WHO, 2010). This work highlighted the importance of IPE in the development of a collaboration-ready workforce, connecting interprofessional healthcare teams to the provision of better healthcare services leading to improved health outcomes (WHO, 2010). In addition, a recent report highlights the importance of the timing, duration and relevance of IPE in promoting behavior changes among individual health professionals (Frenk et al., 2010).

A global scan of literature was performed to illuminate international trends in IPE (Rodger & Hoffman, 2010). The study was commissioned by the WHO to answer questions such as where in the world IPE occurred, how it is conducted and why it is offered. The researchers used an internet-based survey targeting educators and researchers in 2008. The results included 396 responses representing 41 countries. Researchers found that IPE was often voluntary (22%); not based on explicit learning outcomes (34%); not assessed for what was learned (63%); not offered by trained facilitators (69%); and not formally evaluated (30%) (Rodger & Hoffman, 2010). Participants reported many benefits of IPE for education, practice and policy. Despite limitations of relying on self-reports and an English-only, internet-based format, the authors concluded that significant efforts are required to ensure that IPE is designed, delivered and evaluated in keeping with internationally recognized best practice (Rodger & Hoffman, 2010).

In addition, multiple reviews of the IPE literature have been conducted (Abu-Rish et al., 2012; Reeves, 2009; Reeves, Goldman, Burton, & Sawatzky-Girling, 2010a; Reeves et al., 2010b; Reeves, Perrier, Goldman, Freeth, & Zwarenstein, 2013; Rodger & Hoffman, 2010; Thannhauser, Russell-Mayhew & Scott, 2010). Key themes from these

review works have been used to inform this research project and will be discussed here. Findings include a discussion of current trends in the IPE of health science students, (Abu-Rish et al., 2012). This literature review included qualitative, quantitative and mixed method educational intervention studies published in peer-reviewed journals between 2005 and 2010. A total of 83 articles were included in the authors' review. Findings showed multiple IPE strategies and formats. Small group discussion was the predominant format (*n*=48, 57.8%), followed by case- or problem-based learning (*n*=40, 48.2%), large group lectures (*n*=31, 36.1%), reflective exercises (*n*=29, 34.9%), clinical teaching or direct interaction with patients (*n*=29, 34.9%), simulation (*n*=22, 26.5%) and community-based projects (*n*=14, 16.9%) (Abu-Rish et al., 2012). One strategy the authors suggest is greater standardization of reporting in IPE intervention studies to facilitate replication and dissemination of interventions.

Researchers have also conducted a synthesis of systematic review evidence of IPE (Reeves et al., 2010a). This systematic review found that IPE varied in terms of content, duration, and professional participation. The authors discussed that the studies that evaluated IPE were of variable quality and captured a range of different outcomes. Outcomes varied from lower-quality reports of learner satisfaction to changes in the delivery of care (Reeves et al., 2010a). Despite the concerns raised regarding methodological rigor, the authors concluded that IPE delivered in a variety of settings was generally well received by learners and enabled the acquisition of knowledge and skills necessary for healthcare team collaboration (Reeves et al., 2010a).

The IPE literature has also highlighted the state of the science of the instruments and measures used in IPE (Thannhauser et al., 2010). In this literature review, the

authors' sought to examine the quantitative measures used in the IPE literature. Twenty-three instruments were identified and analyzed for validity and reliability statistics, sample size, ease of access to items on measure, and applicability of measure to diverse professional populations. The authors found sufficient data for two measures: the Readiness for Interprofessional Learning Scale and the Interdisciplinary Education Perception Scale. The researchers found limited information existed for the remaining measures. In their examination, the authors conclude that despite the number of measures available for evaluating IPE, most lack sufficient theoretical or psychometric development (Thannhauser et al., 2010).

Recent scholarly efforts have sought to substantiate the effectiveness of IPE and determine the effects of IPE on professional practice and health care outcomes (Reeves et al., 2010b; Reeves et al., 2013). The researchers determined that there has been a limited number of studies that assess the effectiveness of IPE interventions compared to education interventions in which the same professions were learning separately from one another (Reeves et al., 2010). In fact, this systematic review found no studies where researchers were able to assess the effectiveness of IPE interventions compared to education interventions where disciplines engaged in learning separately (Reeves et al., 2010). Instead, IPE has been deemed effective with IPE interventions compared to control groups which received no education intervention.

An update to this work was conducted again in 2013 and published as a Cochrane Review. The researchers sought to assess the effectiveness of IPE interventions compared to separate, profession-specific education interventions and to assess the effectiveness of IPE interventions compared to no education intervention (Reeves et al., 2013). The

authors' method was to search the Cochrane Effective Practice and Organization of Care Group specialized register, MEDLINE and CINAHL, for the years 2006 to 2011 (Reeves et al., 2013). The researchers also hand searched the Journal of Interprofessional Care (2006 to 2011), reference lists of all included studies, the proceedings of leading IPE conferences, and websites of IPE organizations (Reeves et al., 2013).

Inclusion criteria for this systematic review included randomized controlled trials, controlled before and after studies and interrupted time series studies of IPE interventions that reported objectively measured or self-report outcomes on a validated instrument were included in the review (Reeves et al., 2013). In addition, the authors included patient/client outcomes and healthcare process outcomes. For data collection and analysis, at least two review authors independently assessed the eligibility of potentially relevant studies. For included studies, at least two review authors extracted data and assessed study quality. The results located nine new studies, which were added to the six studies from the original review yielding 15 studies. The results showed that seven studies indicated that IPE demonstrated positive outcomes in several areas. These areas include diabetes care, emergency department culture and patient satisfaction, collaborative team behavior and reduction of clinical error rates for emergency department teams, collaborative team behavior in operating rooms, management of care delivered in cases of domestic violence, and mental health practitioner competencies related to the delivery of patient care. Four of the included studies reported both positive and neutral outcomes. Finally, four studies reported that the IPE interventions had no impact on either professional practice or patient care (Reeves et al., 2013). Yet, despite

the nine new studies, all of the included studies continued to measure the effectiveness of IPE interventions compared to no educational intervention.

The need to measure the effectiveness of IPE to a control group continues. A 2018 systematic review of the state of IPE in nursing continued to note that studies that use a control group and/or two intervention groups are needed to compare outcomes after interprofessional interventions (Rutherford-Hemming & Lioce, 2018).

Online IPE

Though IPE is widely seen as a strategy to improve the ability to equip health profession students with the knowledge, skills, and attitudes necessary for effective team based care (Lapkin et al., 2013); designing, implementing, evaluating, and disseminating IPE carries significant costs. Barriers to IPE implementation include scheduling challenges, difficulty in matching students of compatible level, limitations in faculty and staff time, insufficient funding, and inadequate administration support (Abu-Rish et al., 2012). Online approaches to IPE have the potential to enhance learning and overcome geographical and logistical issues inherent in delivering face-to-face IPE and increasingly, online delivery modalities are being used to overcome these barriers. Additional literature review was conducted to synthesize what is known about online delivery of IPE.

Research has demonstrated small scale efficacy of online IPE. A study aimed to develop, implement and evaluate an online IPE dementia case study for health science students used both quantitative and qualitative measures to evaluate online IPE effectiveness (Cartwright, Franklin, Forman, & Freegard, 2015). The Interprofessional Socialization and Valuing Scale (ISVS) was used to assess students' values, attitudes and

learning outcomes before and after participation in an online case study. In addition, thematic analysis of students' free text responses was conducted. A total of 125 students from five health sciences disciplines participated in the online IPE dementia case study. The mean age of participants was 27, with a range from 19 to 60 years of age. Participants included 48 speech pathology, 4 health information management, 24 social work students, nine occupational therapy and nine nursing students. The researchers found students' ISVS scores improved significantly following online participation, and the qualitative results support a shift towards interprofessional collaboration and client-centered care (Cartwright et al., 2015). One limitation of this study was attrition issues. Of the 125 students who participated in the online case study, pre- and post-data were available for only 42 participants. In addition, there was disparate representation across the different health disciplines.

Another qualitative study examined the perceptions of students participating in online IPE. Students from a variety of health science disciplines including paramedic, nursing, occupational therapy, physiotherapy, and nutrition and dietetics participated in an online IPE module. Focus groups were conducted and thematic analysis was employed to analyze interview transcripts. The authors describe four themes that emerged in the data: professional understanding, patient-centeredness, comparison with other IPE activities, and overcoming geographical boundaries (McKenna et al., 2014). The authors noted that students were overwhelmingly positive about their learning experiences and the value of the module in assisting their understandings of the roles of other health professionals. One limitation of this study is that the online IPE activity was a voluntary activity outside of course requirements. Therefore, students most interested in fostering

collaborative team relationships with their interprofessional peers may have self-selected for participation. In addition, this qualitative data was gleaned through focus group methodologies which may limit the comfort of an individual participant to voicing a dissenting or negative perspective.

Online IPE is used for both current health science students and health professional continuing education. One qualitative study sought to understand the experiences, advantages, and challenges of group versus individual online learning for practicing health professionals. Fifteen multidisciplinary participants completed a 12-week online course on either diabetes or traumatic brain injury. The online course consisted of modules and a longitudinal case exercise, done either individually or as a group. Focus group sessions exploring participants' experiences after course completion and at 4 months were conducted, transcribed, and analyzed for recurring themes. Both groups felt they learned about interprofessional roles; however, group learners described a richer learning experience and understanding of interprofessional roles through the online collaboration exercise (MacNeill, Sparaggis-Agaliotis, & Hanna, 2014).

Qualitative reports demonstrate that sub-components of IS can be achieved through interprofessional simulation. An IPE curriculum that was introduced to health and social care discipline students also found thematic evidence of achievements in IS (Pulman, Scammell, & Martin, 2009). A simulated web-based community was developed for interprofessional participants and post-interprofessional simulation data was collected using focus groups and open-ended questionnaires (Pulman et al., 2009). One of the qualitative themes that emerged for both staff and student participants was valuing professional differences and identity (Pulman et al., 2009). In another study, students

participated in a hybrid online and in person simulation workshop (Ellman et al., 2012). The authors analyzed the free-text responses of student participants and found that students of all professions recognized important issues beyond their own discipline, the roles of other professionals, and the value of team collaboration (Ellman et al., 2012).

Online delivery of IPE carries potential limitations, notably the preponderance of agreement in online discussion forums and questions of whether the online learning environment can optimally socialize students to interprofessional collaboration. Research is finding online forums to facilitate both collaboration and conformity (Clouder et al., 2011). In one qualitative study, discourse analysis was used to analyze digital texts of interaction in online forums. The discussion forum showed evidence of increased interprofessional knowledge and understanding, as well as capacity for interprofessional dialogue. Discussions were largely characterized by agreement, disagreement was far less common with very few posts showing any suggestion of this at all (Clouder et al., 2011). The propensity to favor agreement and in effect to conform to popular opinion could prove problematic for health care students in the workplace, where the ability to voice a dissenting opinion is needed (Clouder et al., 2011).

Summary of Gaps in the Literature

Though IPE is widely seen as a strategy to improve the ability to equip health profession students with the knowledge, skills, and attitudes necessary for effective team based care (Lapkin et al., 2013); designing, implementing, evaluating, and disseminating IPE carries significant costs. Barriers to IPE implementation include scheduling challenges, difficulty in matching students of compatible level, limitations in faculty and

staff time, insufficient funding, and inadequate administration support (Abu-Rish et al., 2012). Therefore, persuasive evidence is needed to justify the need for IPE.

One concern raised in the literature is that many IPE programs are not guided by theoretical frameworks (Abu-Rish et al., 2012). In response to this concern, this research project has presented a compelling guiding theoretical framework.

Despite the fact that the number of studies focusing on IPE has grown since the IOM's 2003 report, the evidence demonstrating outcomes from interprofessional initiatives is underwhelming. The literature illuminates several reasons for this. First, though the goal of IPE is to enable collaborative practice, there is a lack of attention in IPE to issues of power and conflict and resolution strategies. IPE educators do not meaningfully address these issues (Paradis & Whitehead, 2015). Incorporating attributes of IS in IPE initiatives can offer strategies for addressing systematic biases and promoting deeper behavior change.

As presented in the literature review, a challenge to substantiating the value of IPE has been a limited number of studies that assess the effectiveness of IPE interventions compared to education interventions in which the same professions were learning separately from one another (Reeves et al., 2010a). In fact, one systematic review found no studies where researchers were able to assess the effectiveness of IPE interventions compared to education interventions where disciplines engaged in learning separately (Reeves et al., 2010a). Instead, IPE has been deemed effective with IPE interventions compared to control groups which received no education intervention. Therefore, additional study is needed to establish IPE efficacy beyond comparing knowledge, skills, or collaborative attitudes for an interprofessional group to a group of

students who received no planned learning or intervention. IPE outcomes need to be compared between mixed-discipline learners receiving an IPE intervention and a group of single-discipline students learning principles of collaborative teamwork as part of their professional training or usual care.

The second update to the original systematic review reiterated this gap. The systematic review concluded that to improve the quality of evidence relating to IPE and patient outcomes or healthcare process outcomes studies that assess the effectiveness of IPE interventions compared to separate, profession-specific interventions are necessary (Reeves et al., 2013). The need to measure the effectiveness of IPE to a control group continues. A 2018 systematic review of the state of IPE in nursing continued to note that studies that use a control group and/or two intervention groups are needed to compare outcomes after interprofessional interventions (Rutherford-Hemming & Lioce, 2018). This research proposal helps fill this gap noted in systematic reviews of IPE initiatives and proposes to measure the differences in student IS between an IPE cohort and a usual care group of one-discipline learners.

Pilot Study

A pilot study was conducted to establish the feasibility of the design and methods used in the current study and to obtain preliminary data on the effects of mixed discipline cohorts on IS. There were two research aims in the pilot research project. The first aim was to determine if a semester-long course in interdisciplinary palliative care improves students' IS? The research hypothesis was that students will demonstrate greater IS at the end of the interdisciplinary palliative care course. A second purpose of the pilot research project was to determine feasibility for a larger comparative study between a nursing-

only cohort of learners and a mixed discipline cohort of learners. Mixed discipline cohorts are those consisting of learners from a variety of programs of study.

Subjects, sampling, and setting.

Institutional Review Board approval was provided by Marquette University. The research subjects were health professional students enrolled in an online Interdisciplinary Palliative Care course. The online Interdisciplinary Palliative Care course was offered both fall and spring semesters at a large, urban, research university in the Midwest. The fall section of the course was open to students from a variety of programs of study. The Interdisciplinary Palliative Care course is taught by an expert faculty member and the course curriculum was originally grant funded through the National Institute of Health (NIH), National Cancer Institute and corresponds with End-of-Life Nursing Education Consortium (ELNEC) competencies.

The purpose of the Palliative Care course was to provide an understanding of the breadth and depth of palliative care practices and services available to caregivers, patients, and their families. Course objectives were to: (a) describe palliative care, including its history, tenets, ethical and legal issues; (b) practice self-reflection as it relates to palliative and end of life care; (c) evaluate the importance of effectively working in teams in palliative care; (d) demonstrate through case discussion complex decision making skills in palliative care; and (e) identify opportunities to use palliative care approaches in the student's discipline or practice area. The interdisciplinary course was offered in a Web-based format.

The course included a module on Palliative Care and Interdisciplinary teams. Stated learning objectives of this module included: (1) describe the composition of a

palliative care team and potential roles of the team members; (2) describe principles key to successful interdisciplinary teamwork; (3) identify skills and techniques to enhance effective interdisciplinary team communication; and (4) discuss issues related to managing conflict among members of an interdisciplinary palliative care team. Readings and content focus on members of the interdisciplinary team, team roles, and issues. Student assignments in this module include reflection and discussion questions for peer dialogue.

All student members of the fall 2015 mixed discipline cohort were recruited to participate in the research project. Students were recruited through online course announcements and email. Informed consent was obtained from all participants. An incentive for participation was provided. Participants were notified that those who completed both the pre and post ISVS would be entered in a drawing to receive one twenty-five dollar Amazon gift card.

The class enrollment was twenty-two students. Seventeen students completed the pre-ISVS and six students completed the post-ISVS. All six students who completed the post-ISVS had completed the pre-ISVS as well. Students who had completed the pre-ISVS but not the post-ISVS were removed from the data results due to missing data. This yielded a total sample of six students.

Data collection.

The ISVS was developed to quantify the beliefs, behaviors, and attitudes of students/individuals/clinicians that underlie their IS or readiness for collaborative practice in health care settings. The ISVS is a 24-item questionnaire with each item rated on a 7-

point Likert scale (King et al., 2010). Permission to use the tool was sought and granted from developers of the instrument.

The ISVS was originally developed to be used in IPE initiatives as a measure of degree to which transformative learning takes place. The instrument operationalizes transformative learning socialization as changed assumptions and worldviews, enhanced knowledge and skills concerning interprofessional collaborative teamwork, and shifts in values and identities (King et al., 2010). In this pilot project, readiness for collaborative practice was operationalized as IS and therefore measured using the ISVS. During instrument development, the authors began by developing a conceptual framework of IS and valuing of interprofessional collaborative practice.

Content validity of the instrument was addressed in several ways. Items were generated based on literature review and researcher expertise to represent the domain of interest. The authors developed a set of items to reflect the three fundamental concepts of interprofessional socialization and valuing of team collaboration: beliefs, behaviors, and attitudes. The ISVS asks respondents to rate the extent to which a belief, behavior, or attitude is present, using a 7-point Likert scale with all points labeled as follows: 1 = not at all; 7 = to a very great extent. A "not applicable" response option was also included on the instrument. Items were reviewed by the Evaluation Working Group for the Creating Interprofessional Collaborative Teams for Comprehensive Mental Health Services Project (CIPHER-MH project) for clarity of wording and content validity (King et al., 2010).

The sample for the pilot testing of the instrument was university students in health care professions. The sample for instrument development consisted of a convenience

sample of 124 health profession students from the disciplines of Occupational Therapy, Nursing, Clinical Kinesiology, Dietetics, and Speech and Language Pathology (King et al., 2010).

Construct validity of the instrument was supported. To do this, principal component analysis with factor loading was performed. The criteria for retaining items were a factor loading of at least 0.30, and (b) if an item loaded on two factors, then a minimum difference of 0.10 was needed to retain the item (King et al., 2010). Ultimately, principal component analysis led to three subscales: ability to work with others, value in working with others, and comfort in working with others. In the initial study, the three subscales of the ISVS accounted for 49% of the variance in responses (King et al., 2010). In addition, Pearson correlation coefficients among the ISVS scales ranged from 0.34 to 0.61 (King et al., 2010). These correlations indicate that the scales capture different aspects of interprofessional socialization. Other procedures to establish validity (convergent/divergent validity, criterion related/concurrent validity, or predictive validity) were not conducted.

Instrument reliability has also been reported. Internal consistency was determined using Cronbach's alpha. The coefficients for each of the three subscales ranged from 0.79 to 0.89 indicating moderate to excellent reliability (King et al., 2010). Other tests of instrument reliability such as parallel forms testing, test-retest stability were not determined. No revisions to the instrument had been published at the time of the pilot study. The tool has been used in at least one subsequent published study (Cartwright et al., 2015).

Procedure.

Data collection occurred during the fall 2015 section of Interdisciplinary Palliative Care. All students in the fall multi-discipline course were recruited to participate. At the onset of the course, an outside link to the research project was posted on the course website. The link to the online survey was available only on the course website to ensure that only students who are participating in the course would have access to complete the survey. The link contained additional information on the research project including informed consent and researcher contact information. Information to the students included that they are being asked to participate in a research study. Students must be age 18 years or older to participate. The purpose of the study was stated and students were informed that there are no foreseeable risks associated with this project, nor are there any direct benefits to them. A statement explicitly informed students that their grade will not be affected whether or not they choose to participate. Students were informed that completion of the survey indicates consent to participate. Students were informed that the researcher will make every effort to ensure that responses are kept confidential. Students were told that participation is voluntary and that they may withdraw from the study at any time. In addition, students were provided researcher contact information including email and phone to contact if they have any questions about the research project. Finally, students were thanked for their consideration and participation.

An online form was created to deploy the ISVS survey to students. Access to edit the online survey or view student results was password protected. Instructions to complete the instrument were provided to students as follows: “This instrument is

designed to help you explore your perceptions of what you have learned about working with professionals from other disciplines. Please complete the following questionnaire based on your own views of your experiences. Indicate the degree to which you hold each of the beliefs, behaviors, and attitudes that are described. You are asked to consider where you feel you are now. Respond to each statement using the 6-point scale with 1 meaning not at all and 6 meaning to a very great extent. Please respond by selecting the one number that you feel best fits your experience. If you feel the statement does not apply to you please use the zero value (0).” An example of a valuing statement and corresponding Likert response options follows. “I am comfortable debating issues within a team.” The student would then select either “to a very great extent (6), to a great extent (5), to a moderate extent (4), to a small extent (3), to a very small extent (2), not at all (1), not applicable (0).”

Participants were recruited to complete a post-survey at course completion. Reminders to complete the post-survey included course announcements, postings, and/or email communication. Instrument deployment, instructions, and questions were consistent with the pre-test administration as described above.

Student grades were not affected whether or not they chose to participate. The course faculty member was not aware whether an individual student participated in the research project or completed the ISVS survey. Students were asked to provide their names in order to link pre and post-course survey data and to provide the gift card award.

Students were also asked to provide consent and Family Educational Rights and Privacy Act (FERPA) release for the primary investigator to review a course assignment, the scholarly reflection paper, for IS themes. Permission to review the scholarly

reflection assignment was sent in a separate email request from the course instructor to comply with FERPA regulations.

Data analysis.

Seven students replied to the email query to review their scholarly reflection paper for IS themes. All seven students who responded to the email request had also consented and completed the pre-course ISVS. Of the seven replies, six students consented to have their paper reviewed and one student declined consent. Two of the six students who consented to have their paper included also completed the post-course ISVS, four did not. The one student who declined to have their paper included did complete both the pre and post-course ISVS.

The six students who consented and the one student who declined permission to review the course assignment for IS themes were all female. Six intended a career in health sciences and one identified as an accounting major. Of the six who consented to be included, two were intending to work as a physician assistant, one was a biomedical sciences student who planned to enroll in the direct entry nursing master's program, one was pre-dentistry, and one majored in speech pathology/audiology. The student who declined permission to have the course assignment reviewed for IS themes was a physician assistant major. Scholarly reflection papers were read and examined for IS themes, including comparative thematic analysis between the two students who completed both the pre and post ISVS and the four students who completed solely the pre-ISVS.

Conventional content analysis was performed to interpret meaning from the context of the student reflection data. Content analysis is a qualitative research strategy

for analyzing text data. Coding categories were derived directly from the text data (Hsieh & Shannon, 2005). Data analysis began with reading all data to become immersed in it and obtain a sense of the whole (Hsieh & Shannon, 2005). Then, data were read word by word to derive codes that appear to capture key thoughts or concepts. Next, notes were made on impressions, thoughts, and initial analysis. As this process continued, labels for codes emerged. Codes were then sorted into categories based on how different codes were related and linked (Hsieh & Shannon, 2005).

Quantitative data analysis was also performed. Total student enrollment for the mixed discipline cohort of the Palliative Care course was 22 students. Of this total class enrollment, 21 students were female and 1 student was male. Seventeen students completed the pre-ISVS and six students completed the post-ISVS. The pre-test sample was entirely female. The intended majors of the students who completed the pre-test were physician assistant (n = 6), pre-dental (n = 2), nursing (n = 4), pre-med (n = 1), psychology (n = 1), speech pathology (n = 1), accounting (n = 1), and biomedical science (n = 1).

All six students who completed the post-ISVS had completed the pre-ISVS as well. Students who had completed the pre-ISVS but not the post-ISVS were removed from the data results due to missing data. This yielded a total sample of six students. Next, categorical and continuous variables will be described. The research questions will be addressed to determine if there is a statistically significant change in the students' pre and post ISVS scores.

Consideration was given to categorical variables. Categorical variables are nominal levels of measurement and involve using numbers as labels to name attributes

and classify them into categories (Polit, 2010). Examples of categorical variables in this data set were student gender, program of study, and major. Numbers assigned in categorical variables are arbitrary, therefore it is not meaningful to compute a mean. Instead, data were analyzed with a frequency distribution.

The first variable analyzed was gender. There were no missing entries in this variable. All participants were female. The students lost to attrition, those who completed the pre-ISVS but not the post-ISVS were also entirely female.

The most common intended major in this cohort was Physician Assistant with 3 participants (50%). The other intended majors included speech pathology, nursing, and pre-dental with one respondent each. Though the course is open to both undergraduate and graduate students, all students who completed both the pre and post ISVS were undergraduate students. In fact, all students who completed the pre-ISVS survey were undergraduate students.

Results.

The emergent categories in the qualitative data set yielded two overarching themes: valuing the other and collaboration as imperative.

Valuing the other.

Students included reflection on the importance of interprofessional learning in their scholarly reflection paper. Codes such as input from peers, ability to connect, value other professionals, and peer insight coalesced around a theme of valuing the other. Valuing the other was a prominent theme across student reflections.

One student commented on how teams in healthcare involve the integration of many different healthcare professionals. She noted that “everyone should respect the

value the other provides." This student included the role of the housekeeper or kitchen staff on the patient experience. Though the student argued that some members of the team are more integral than others, specifically the doctors, pharmacists, and nurses. This may reflect an emerging and hierarchical valuation of the contribution of the various members of the health care team. The theme of valuing the other also emerged in the data when students reflected on the importance of the contributions of each member of the interprofessional team. This is evident in one student's comment that "patient care is best achieved through contributions of numerous healthcare professionals working together as an interdisciplinary team with a focus of providing compassionate and empathetic care to each and every patient."

Analysis indicated that the theme of valuing the other was present whether students completed the post-course ISVS or not. One physician assistant student's reflection extended the theme of valuing the other to caring for the other members of the interprofessional team. The student noted, "The class also made me think about ways that I might care and support my fellow team members, which was not something that I had considered previously."

Collaboration as imperative.

Student reflections demonstrated that healthcare team communication was not just important, but imperative. Another student reflected that, when successful, the "integrated team … works together to find solutions that are in line with the desires of the patient and his/her family." Students noted that collaboration is not only important to quality patient care but to bringing meaning to their own work as well. One student reflected that "this idea of teamwork in the healthcare setting is very attractive to me. …

at Marquette and as someone who grew up always surrounded and supported by a team, one of the most exciting things about my future work in medicine will be the opportunity to work on a multidisciplinary team."

In addition, collaboration is seen as imperative to student learning. Students reflected on a time where they were challenged by and appreciated the viewpoint of students from another discipline. "Asking the patient what she may already know or what she may like to know more about so that the patient has a sense of control. This is not something that I had considered but makes a lot of sense … This was another moment that solidified the importance of collaboration within a team." The second student reflected "it is very beneficial to have a group of people from various disciplines because of the mix of perspectives and it allows for each of us to think in ways we had not thought of previously." Students clearly saw value in the interaction with peers and the format of the course commenting that "the class was set up in a way that fostered deeper consideration of issues and sharing of ideas between students."

Quantitative results.

The first aim was to determine if a semester-long course in interdisciplinary palliative care improved students' IS. To answer this research aim, the dependent t-test, also called the paired samples t-test was employed. This statistical test compares the means between two groups on the same continuous, dependent variable. The dependent variable in this pilot project is the ISVS. Group one was the students pre-test and group two was the post-test results.

There are several assumptions to consider when employing the paired samples t-test. First, the dependent variable should be measured on a continuous scale. The likert

scale used in the ISVS was treated as a continuous variable. The second assumption for this statistical test is that the independent variable should consist of two related groups or matched pairs. The related groups in this study were that the same subjects completed both the pre and post ISVS. The third assumption is that there should be no significant outliers in the data. There were no single data points that did not follow the usual pattern in this data.

The fourth assumption is that the distribution of differences between the two groups should be approximately normally distributed. The Shapiro-Wilk Test is more appropriate for small sample sizes. For this reason, the Shapiro-Wilk test was used as the numerical means of assessing normality. The Shapiro-Wilk test of normality was conducted and found to be .402 for the pre-course ISVS and .599 for the post-course ISVS. Therefore, the ISVS variables were normally distributed because the value of the Shapiro-Wilk Test was greater than 0.05 (Pallant, 2010).

The results of the dependent t-test in SPSS were as follows: $t(5) = -1.255$, $p = .265$. The mean of the students' ISVS scores increased from 123.5 to 126.33, however, this increase was not statistically significant.

Cronbach's alpha was run for the total scale and sub-scales. The Cronbach's alpha for the entire ISVS was 0.763, though a sample of six was too small for appropriate interpretation. Cronbach's alpha for subscale one, self-perceived ability to work with others consisted of nine items ($\alpha = .763$). Subscale two, value in working with others consisted of nine items ($\alpha = .795$). Finally, subscale three, comfort in working with others consisted of six items ($\alpha = .114$). The total ISVS, subscale one, and subscale two

demonstrate high internal consistency, the subscale 3 demonstrates low internal reliability.

Discussion.

Discussion will include a comparison of this pilot study's results with the IPE literature. In addition, analysis of quantitative findings will be presented. Finally, limitations to the pilot study and lessons learned for future research will be discussed.

Comparison with the literature.

The WHO report confirms that although interprofessional education is normally delivered face-to-face, technology is emerging as another valuable option (WHO, 2010). Key characteristics of IPE include challenging students with learning activities of increasing complexity, incorporating cooperative learning, and including experiential learning (Luke et al., 2009). The authors contend that asynchronous discussion boards can be used to meet the cooperative learning and experiential learning objectives (Luke et al., 2009).

Online delivery of IPE carries potential limitations, notably the preponderance of agreement in online discussion forums and questions of whether the online learning environment can optimally socialize students to interprofessional collaboration. Research is finding online forums to facilitate both collaboration and conformity (Clouder et al., 2011). In one qualitative study, discourse analysis was used to analyze digital texts of interaction in online forums. The discussion forum showed evidence of increased interprofessional knowledge and understanding, as well as capacity for interprofessional dialogue. Discussions were largely characterized by agreement, disagreement was far less common with very few posts showing any suggestion of this at all (Clouder et al., 2011).

The propensity to favor agreement and in effect to conform to popular opinion could prove problematic for health care students in the workplace, where the ability to voice a dissenting opinion is needed (Clouder et al., 2011).

In this qualitative analysis, student informants did not demonstrate only agreement with their peers, indeed they displayed comfort with disagreement. One student reflected that she "was able to apply concepts … learned this semester to the patient and either agree with or refute what the individuals in the simulation were determining for the patient." Another student commented that there are "times I feel that one treatment strategy is best for a patient; however, a colleague may disagree."

Several studies have examined the impact of online IPE through the students' perspective. Themes such as professional understanding, patient-centeredness, comparison with other interprofessional education activities, and overcoming geographical boundaries emerge (McKenna et al., 2014). In addition, students are often overwhelmingly positive about their learning experiences and the value of the IPE learning in assisting their understandings (McKenna et al., 2014). However, this qualitative data was gleaned through focus group methodologies which may limit the comfort of an individual participant to voicing a dissenting or negative perspective. In another study, students participated in a hybrid online and in person simulation workshop (Ellman et al., 2012). The authors analyzed the free-text responses of student participants and found that students of all professions recognized important issues beyond their own discipline, the roles of other professionals, and the value of team collaboration (Ellman et al., 2012).

The qualitative analysis finding of valuing the other resonates with our understanding of IS. A conceptual analysis of IS yielded five component attributes to IS: building interprofessional awareness, experiential learning, managing professional role/team expectation congruence, valuing, and evolving knowledge, skills, and attitudes (Groom, unpublished manuscript).

The first attribute of IS is building interprofessional awareness. Building interprofessional awareness is centered on articulating the differences among professions, establishing and understanding of these differences, and determining where one fits in relation to other health care professionals (Arndt et al., 2009). The second attribute of IS is experiential learning. The shared, formative nature of experiential learning builds the collaborative values and attitudes needed in interprofessional teams. Therefore, in the conceptual understanding of IS it is evident that there is a primacy and necessity of experiential learning to achieve IS.

The next attribute of IS is managing professional role/team expectation congruence. Managing professional role and team expectation congruence is the extent to which an individual is successful in maintaining a collaborative interprofessional identity in their ongoing practice despite potentially conflicting demands and contingencies of the workplace (Veerapen & Purkis, 2014). The fourth attribute of IS that emerges in the literature is valuing. Valuing encompasses the individuals evolving appreciation and understanding of the import of a collaborative team approach (King et al., 2010). Individuals must see meaning and worth in working with others and appreciate the benefit of an interprofessional approach to healthcare delivery. The final attribute of IS evident through the literature review is evolving knowledge, skills, and attitudes. The

purposeful selection of the term evolving reflects that the interprofessional team member must stay abreast and current in responding to the developing nature of team based care and the progress of advancing competencies. The initial qualitative findings in this pilot project support further research of the IS framework.

Though the student mean scores increased from the pre to the post-course ISVS, the quantitative data analysis showed no statistically significant difference. Additional study with a larger sample size comparing mixed discipline and nursing student only cohorts is needed.

Limitations.

One potential limitation was that all students who completed either the quantitative or qualitative portion of this research project were female. There was one male student in the class session, however he did not consent to participate in either the qualitative or quantitative research project. This may affect generalizability of the pilot project findings. Another limitation of the current pilot project is the small sample size in both the quantitative and qualitative projects. Consideration to increasing the sample size is discussed below. Specific to the qualitative analysis, one potential limitation is that there was only a single researcher conducting the qualitative content analysis.

Lessons learned.

One of the major lessons learned in this pilot project concerns recruitment and attrition of student research participants. Seventeen students of the total course enrollment of twenty-two participated in the pre-course ISVS survey, a participation rate of 77%. However, only 6 of the 17 students also completed the post-course ISVS, meaning nearly 65% of the initial survey participants were lost to attrition. In the

qualitative portion of the pilot project, participation was also a concern. Seven students consented to participate in the qualitative portion of the pilot project, a participation rate of 31%. Greater sample size is needed to better be able to detect a statistically significant change in IS.

Several strategies will be employed in the larger dissertation study to address the issues of recruitment and retention. First, more effort will be placed on study recruitment at the onset. In this pilot project a course announcement was the sole method of recruitment in the quantitative portion of the project. Email recruitment will also be employed. Both an initial email recruitment notice and a follow-up reminder two days prior to closing of the pre-course study will be used. Similarly, to increase student retention in the post-course ISVS assessment, increased participant contact will be employed. In the pilot project, the student researcher again notified student class participants of the post-course ISVS survey via an online course announcement. Since this yielded a retention rate of only 35%, additional strategies are needed. In addition to posting the online announcement, the researcher will email all participants from the pre-course survey to remind them of the need for a post-course assessment. Finally, acknowledging the constraints to student time, particularly at the end of the student semester, grant funding was sought and received to provide gift card incentives to student participants. This is expected to significantly increase recruitment and retention in the larger research study.

Conclusions.

Overall, the student researcher was successful in planning, implementing, and analyzing the results of this pilot study, suggesting the experience and fortitude to

successfully conduct a larger dissertation project. In summary, the objectives of this research practicum to develop competence in data analysis techniques appropriate to proposed research and investigate feasibility for larger implementation of the research proposal were met. Support of course faculty to conduct a research project within an online interprofessional education course was gained. Institutional Review Board (IRB) approval was sought and given. Subjects were recruited and consented appropriately and initial qualitative and quantitative analysis was conducted and reported. The effect of IS on interprofessional education initiatives remains a relevant and needed area of research. Reflection on lessons learned will help strengthen the feasibility of a larger research project in the area of IS.

Statement of the Assumptions of the Study

1. IS can be measured using the Interprofessional Socialization and Valuing Scale.
2. The number of interprofessional students and nursing students in the mixed discipline group provide enough interprofessional experience to compare with the nursing only course in Spring in terms of IS.
3. Sources of IS beyond the interventions were similar for students in the nursing student only and mixed discipline cohorts.

Research Questions and Hypotheses to be Tested

There were two research questions and corresponding hypotheses for this research project:

1. Does participating in an educational session that includes teamwork and collaboration principles improve students' IS?

Hypothesis: Students will demonstrate greater IS after learning teamwork and collaboration principles.

2. Does a mixed-discipline group of students demonstrate greater improvement in IS compared to a single discipline group of students?

   Hypothesis: Mixed-discipline students will demonstrate greater improvement in IS compared to a single discipline student group.

CHAPTER 3

Research Design and Methods

Introduction

This chapter will describe the research design, study methods, description of the sample, procedures for data collection, statistical analysis, and limitations of the study.

Research Design and Methods

The study design was a quasi-experimental, cohort study. The study utilized pre-test/post-test of student groups to compare in- and between-group IS. The research project followed a pragmatic trial approach designed to be able to quickly transfer research findings to educational practice. Consistent with pragmatic clinical trials, this research methodology used usual care as the control condition (Kovach, 2015).

The outcome variable of interest was IS. The predictor or intervention variable was the student cohort (either mixed discipline or nursing only). In addition, there were independent variables to consider. A student demographic survey gathered information on student major, gender, and program of study (either undergraduate or graduate).

Open-ended questions were included with the online ISVS. The inclusion of open-ended questions was needed to round out the understanding of student experiences in IS in mixed discipline and nursing student only cohorts. Development and inclusion of the open-ended questions was informed by the literature review and the pilot study qualitative findings.

Subjects, sampling, and setting.

The research subjects were health professional students enrolled in an online Interdisciplinary Palliative Care course. The online Interdisciplinary Palliative Care course was offered both fall and spring semesters at a large, urban, research university in the Midwest. The fall section of the course was open to students from a variety of programs of study. Students include pre-medicine, physical therapy, physician assistant, religious studies, and social work. The spring semester offering of the course enrolled a large number of nursing students as part of their required program of study. Due to the large course enrollment, select section(s) of the course featured only nursing students. Therefore, the course sequencing offered a unique design opportunity to investigate how delivering content on collaborative team health care delivery to mixed or single discipline cohorts affects IS.

The Interdisciplinary Palliative Care course was taught by the same expert faculty member in both semesters. The faculty member taught the same curriculum with the same learning activities, readings, and assessments to both learner groups. The course curriculum was originally grant funded through the National Institute of Health (NIH), National Cancer Institute and corresponds with End-of-Life Nursing Education Consortium (ELNEC) competencies. The course faculty member supported this research project and is committed to ensuring intervention fidelity to both learner groups.

The purpose of the Palliative Care course was to provide an understanding of the breadth and depth of palliative care practices and services available to caregivers, patients, and their families. Course objectives were to describe palliative care, including its history, tenets, ethical and legal issues; practice self-reflection as it relates to palliative

and end of life care; evaluate the importance of effectively working in teams in palliative care; demonstrate through case discussion complex decision making skills in palliative care; and to identify opportunities to use palliative care approaches in the student's discipline or practice area. The interdisciplinary course was offered in a Web-based format.

All student members of the mixed discipline and nursing only cohorts were recruited to participate in the research project. Four course sections were offered in the Spring 2017 semester with two designated as nursing student only and two as mixed discipline. The expected class enrollment was approximately twenty-five students in each course section for a total of fifty possible student participants in each cohort. It was expected that 75% of students would consent to participate yielding an anticipated sample size of 37 students in each cohort, 74 total students. Steps were employed to address possible withdrawal bias associated with longitudinal studies.

Power analysis was conducted to determine the appropriate sample size for the analytic approach. The G-Power Program was used to calculate power analysis. Power analysis for two groups and 2 measurements with an effect size, f, of 0.25, error probability of .05, power of .8, yielded a total sample size of 68. Therefore, anticipated enrollment was sufficient for power analysis. The analytic approach is discussed in the data analysis section.

Data collection.

Readiness for collaborative practice was operationalized as IS and measured using the ISVS. A copy of the original ISVS is included, Appendix A. The ISVS was developed to quantify the beliefs, behaviors, and attitudes of

students/individuals/clinicians that underlie their IS or readiness for collaborative practice in health care settings. The ISVS is a 24-item questionnaire with each item rated on a 7-point Likert scale (King et al., 2010). There are three subscales: self-perceived ability to work with others (i.e., nine items; range 59-54), value in working with others (i.e., nine items; range 59-54), and comfort in working with others (i.e., six items; range 56-36). Higher scores indicate stronger expression of beliefs, attitudes, and behaviors reflecting/endorsing interprofessional socialization. Permission to use the tool was sought and granted from developers of the instrument.

The ISVS was originally developed to be used in IPE initiatives as a measure of degree to which transformative learning takes place. The instrument operationalizes transformative learning socialization as changed assumptions and worldviews, enhanced knowledge and skills concerning interprofessional collaborative teamwork, and shifts in values and identities (King et al., 2010). During instrument development, the authors began by developing a conceptual framework of interprofessional socialization and valuing of interprofessional collaborative practice.

Content validity of the instrument was addressed in several ways. Items were generated based on literature review and researcher expertise to represent the domain of interest. The authors developed a set of items to reflect the three fundamental concepts of interprofessional socialization and valuing of team collaboration: beliefs, behaviors, and attitudes. The ISVS asks respondents to rate the extent to which a belief, behavior, or attitude is present, using a 7-point Likert scale with all points labeled as follows: 1 = not at all; 7 = to a very great extent. A “not applicable” response option was also included on the instrument. Items were reviewed by the Evaluation Working Group for the Creating

Interprofessional Collaborative Teams for Comprehensive Mental Health Services Project (CIPHER-MH project) for clarity of wording and content validity (King et al., 2010).

The sample for the pilot testing of the instrument was university students in health care professions. The sample for instrument development consisted of a convenience sample of 124 health profession students from the disciplines of Occupational Therapy, Nursing, Clinical Kinesiology, Dietetics, and Speech and Language Pathology (King et al., 2010).

Construct validity of the instrument was supported. To do this, principal component analysis with factor loading was performed. The criteria for retaining items were a factor loading of at least 0.30, and (b) if an item loaded on two factors, then a minimum difference of 0.10 was needed to retain the item (King et al., 2010). Ultimately, principal component analysis led to three subscales: ability to work with others, value in working with others, and comfort in working with others. In the initial study, the three subscales of the ISVS accounted for 49% of the variance in responses (King et al., 2010). In addition, Pearson correlation coefficients among the ISVS scales ranged from 0.34 to 0.61 (King et al., 2010). These correlations indicate that the scales capture different aspects of interprofessional socialization. Other procedures to establish validity (convergent/divergent validity, criterion related/concurrent validity, or predictive validity) were not conducted.

Instrument reliability has also been reported. Internal consistency was determined using Cronbach's alpha. The coefficients for each of the three subscales ranged from 0.79 to 0.89 indicating moderate to excellent reliability (King et al., 2010). Other tests of

instrument reliability such as parallel forms testing, test-retest stability were not determined.

The standards for instrument development require developers to provide users with sufficient information relating to the procedures used to develop, review and trial the instrument (Oates & Davidson, 2015). Instrument developers should describe the processes by which items have been selected from an item pool and the model such as classical test theory or item response theory that was used for psychometric evaluation (Oates & Davidson, 2015). The ISVS was deemed to meet these standards for instrument development (Oates & Davidson, 2015).

Multiple studies have been conducted using the 24 item, 3 subscale tool (Cartwright et al., 2015; De Vries, Woods, Fulton, & Jewell, 2016; LaRochelle & Karpinski, 2016; O'Brien, McCallin, & Bassett, 2013; Hoti, Formon, & Hughes, 2014; Rossler, Buelow, Thompson, & Knofczynski, 2017; Stubbs et al., 2017). The tool was originally validated with health profession students. Some of the earlier subsequent studies to use the tool continued using health science students in the research population. A 2013 study utilized the ISVS to explore students' perceptions of their interprofessional clinical experience (O'Brien et al., 2013). The study included 37 students, 14 physiotherapy, 18 podiatry, 4 oral health, and 3 students from other majors including nursing, occupational therapy and counselling psychology (O'Brien et al., 2013). The Cronbach alpha in this sample was 0.91 with respective Cronbach alpha scores for the subscales of 0.77, 0.85, 0.74 (O'Brien et al., 2013). A Chi-square test showed that there were no significant differences between the groups on their level of change in

understanding of the other health professions ($X^2(2) = 0.64$, $p = .726$) (O'Brien et al., 2013).

Further research incorporated a medication management review in students' IPE (Hoti et al., 2014). The study included a total of 72 students, 36 pharmacy, 30 physiotherapy and 6 nursing (Hoti et al., 2014). Student responses demonstrated that though there was a statistically significant improvement in students' scores in post-placement ISVS sub-factors (i.e. $p<0.0001$ in all three sub-factor comparisons), there was no significant difference between professions in relation to their attitudes towards IPE in any of the three sub-factors ($p>0.05$) (Hoti et al., 2014).

The ISVS tool has been established and tested with health science students. Recent studies have expanded use of the ISVS beyond health science students to evaluate the beliefs, behaviors, and attitudes about interprofessional practice among therapy professionals (De Vries et al., 2016). The authors found no significant difference between occupational, physical, and recreational therapists, and speech-language pathologists (De Vries et al., 2016). Since the ISVS is a fairly new instrument, principle component analysis was run to ensure that the latent variables measured the intended concepts. The resulting principle component analysis yielded the five factors (De Vries et al., 2015). The three factors in the King et al. study were retained: self-perceived ability to work with others, value in working with others, and comfort in working with others. However, two additional factors were added: self-perception of team responsibility, underscoring the commonality of responsibility and accountability within the group; and valuing of patient-centered care with client and family involvement emphasized (De Vries et al., 2015).

Several potential reasons for the differences in factors were proposed. First, differences may be due to the fact that King et al. used a sample composed mostly of undergraduate students in health and social service professions whereas, this study included professional therapists in the fields of OT, PT, RT, and SLP (De Vries et al., 2015). The additional factors identified in the De Vries et al. 2015 study, "Self-Perception of Team Responsibility" and "Valuing of Patient-Centered Care", may reflect experiences of practicing professionals that students have not yet experienced (De Vries et al., 2015). Second, there was a broader range of disciplines represented in King et al (De Vries et al., 2015). Third, differences may be due to variations in health systems between Canada and the United States (De Vries et al., 2015). Finally, the De Vries study did not include an IPE intervention, rather the study investigated the individual's beliefs, behaviors, and attitudes about actual practice (De Vries et al., 2015).

The ISVS has also been used to examine racial differences in communication apprehension and interprofessional socialization (LaRochelle & Karpinski, 2016). There were significant differences between racial groups for the total ISVS scores with a medium effect size (F=4.40, df=2, 111, p=0.014). The results indicated that Asians had significantly lower scores compared to African Americans with a medium effect size (p=0.022; d=0.55).

The ISVS was also used in the pilot study described in chapter 2. Cronbach's alpha was run for the total scale and sub-scales. The Cronbach's alpha for the entire ISVS was 0.763, though a sample of six is too small for appropriate interpretation. Cronbach's alpha for subscale one, self-perceived ability to work with others consisted of nine items ($\alpha = .763$). Subscale two, value in working with others consisted of nine items ($\alpha = .795$).

Finally, subscale three, comfort in working with others consisted of six items (α = .114). The total ISVS, subscale one, and subscale two demonstrate high internal consistency, the subscale 3 demonstrates low internal reliability.

The developers of the ISVS have refined the originally published version of the ISVS. The originally developed and published ISVS was a 24-item tool (King et al., 2010). A graded response model (GRM) based on item response theory (IRT) was used to re-test items in the original unpublished ISVS-34 questionnaire (King, Orchard, Khalili, & Avery, 2016). The modeling yielded a revised 21-item ISVS that is appreciably different than the previously developed ISVS-24 (King et al., 2016). Eleven items from the ISVS-24 were not in the ISVS-21, and eight new items from the ISVS-34 questionnaire were added (King et al., 2016).

The three-factor model used in the scales for the ISVS-24 were tested, yielding poor fit to the data, X^2 = 1803.5 on 461 *df*, *P*<.001 where nonsignificance is desirable (King et al., 2016). Evidence instead supported a unidimensional versus 3-factor measure (King et al., 2016). Therefore an iterative process was used to select the final items for the revised ISVS-21 (King et al., 2016). The analysis yielded a refined ISVS-21 tool to assess IS in both practitioners and students and assess change in IS as a result of IPE (King et al., 2016).Work on construct validity of the ISVS-21 is required as it was not examined (King et al., 2016). Literature search revealed that as of January 2018 there have not been additional studies published using the revised ISVS-21.

The most recent subsequent studies using the ISVS have continued to use the ISVS-24, the tool used in this research study. Investigators designed a community-based initiative to involve students to IPE while engaging them in community organizations

(Stubbs et al., 2017). The ISVS-24 was used with pre and post changes examined in each of the three subscales (Stubbs et al., 2017). Mean rank scores in all three subcategories increased significantly from baseline ($z = -4.11$, $p < 0.0001$; $z = -3.41$. $p = 0.001$; $z = -2.79$, $p = 0.005$) (Stubbs et al., 2017). Potential limitations present in this study were that students were selected by their programs to participate in the pilot IPE instead of involving all students from the respective health programs, it also included a small number of students, n=24 (Stubbs et al., 2017).

A final research study used the ISVS-24 to evaluate IPE in a variety of modalities such as off-campus clinicals, online programs, and traditional campus programs. This study included 96 undergraduate and graduate health science students (Rossler et al., 2017). There are similarities to the current project in that both include online IPE as well as both undergraduate and graduate learners. Study authors conducted principal component analysis with a varimax rotation (Rossler et al., 2017). Eigenvalues and a scree plot indicated that the 3 subscales on the ISVS-24 were still appropriate (Rossler et al., 2017). The authors removed 4 of the 24 items from the ISVS after evaluating the individual items' loadings (Rossler et al., 2017). The ability, value, and comfort of working in teams' subscale scores improved significantly from pre to post IPE among both undergraduate and graduate students ($p < .001$) (Rossler et al., 2017).

Additionally, the study reported findings for the different health science disciplines. Nursing and speech-language pathology students had significant improvements in the means of all three subscales ($p<.007$) (Rossler et al., 2017). Statistically significant improvement was seen in at least one subscales for public health, health administration, and physical therapy student groups (Rossler et al., 2017). The

change from pre to post test in respiratory therapy students was not statistically significant (Rossler et al., 2017).

Findings from the literature review and pilot study results were used to inform development and inclusion of open-ended questions on the ISVS administered in this research study. The pilot study's qualitative data set yielded two overarching themes: valuing the other and collaboration as imperative. Valuing the other was a prominent theme across student reflections. Students reflected on how teams in healthcare involve the integration of many different healthcare professionals. The theme of valuing the other also emerged in the data when students reflected on the importance of the contributions of each member the interprofessional team. In addition, student reflections demonstrated that healthcare team communication was not just important but imperative. Students noted that collaboration is not only important to quality patient care but to bringing meaning to their own work as well. In addition, collaboration was seen as imperative to student learning. Students reflected on a time where they were challenged by and appreciated the viewpoint of students from another discipline.

In the pre-educational experience questionnaire, students were asked what is their intended profession and why did they select it? They were asked to select a healthcare discipline other than their current intended profession. What do they know about what these team members do? Where did they get this information? In addition, students were asked to describe an experience they have had working with a fellow student outside their own program of study. What benefits did that student's perspective bring to the project? What, if any, challenges did they encounter?

Additional questions were also included on the post-educational experience questionnaire. Students were asked to describe the significance of including a variety of disciplines on the healthcare team. Students were again asked to select a healthcare discipline other than their current intended profession. What do they know about what these team members do? What is the perspective this discipline provides? Again, students were asked to describe an experience they have had working with a fellow student outside their own program of study. What benefits did that student's perspective bring to the project? What, if any, challenges did they encounter?

Procedure.

The research project occurred during the fall 2016, spring 2017, and fall 2017 sections of Interdisciplinary Palliative Care. All students in the fall multi-discipline course were recruited to participate. In the spring semester, course enrollment was anticipated to be greater than 100 students and multiple sections of the course were taught. Due to the multiple sections, sections were designated as nursing student only and mixed discipline. Students from all course sections were recruited to participate. Separate online ISVS survey links were provided to members of the nursing student only section(s) and the mixed discipline section(s) to ensure separation of data. The primary course faculty member who teaches the multi-discipline fall section oversaw all course sections, ensuring consistency of course content and intervention fidelity.

Students were notified of the opportunity to participate in the research project via course announcements, postings and/or email communication. An online form was created to deploy the ISVS survey to students. Access to edit the online survey or view student results was password protected. At the onset of the course, an outside link to the

research project was posted on the course website. The link to the online survey was available only on the course website to ensure that only students who were participating in the course would have access to complete the survey. The link contained additional information on the research project including informed consent and researcher contact information. Students were informed that completion of the survey indicates consent to participate.

Participants were recruited to complete a post-survey at course completion. Reminders to complete the post-survey included course announcements, postings, and/or email communication. Instrument deployment, instructions, and questions were consistent with the pre-test administration as described above.

Methods to minimize attrition were employed. Initially, students received a $15 incentive for completing both the pre-course ISVS survey and the post-course survey. In later semesters, completion of the pre and post course ISVS surveys was a course requirement, but not a graded assignment. Students were asked to provide their names in order to link pre and post-course survey data.

Information to the students included that they are being asked to participate in a research study. Students must be age 18 years or older to participate. The purpose of this study was stated and students were informed that there were no foreseeable risks associated with this project, nor were there any direct benefits to them. A statement explicitly informed students that their grade was not affected whether or not they chose to participate. Students were informed that the researcher made every effort to ensure that responses were kept confidential. Students were provided an opportunity to opt out of participating in the research study. In addition, students were provided researcher contact

information including email and phone to contact if they had any questions about the research project. Finally, students were thanked for their consideration and participation.

Instructions were provided to students completing the instrument as follows: "This instrument is designed to help you explore your perceptions of what you have learned about working with professionals from other disciplines. Please complete the following questionnaire based on your own views of your experiences. Indicate the degree to which you hold each of the beliefs, behaviors, and attitudes that are described. You are asked to consider where you feel you are now. Respond to each statement using the 6-point scale with 1 meaning 'not at all' and 6 meaning 'to a very great extent'. Please respond by selecting the one number that you feel best fits your experience. If you feel the statement does not apply to you please use the zero value (0)." An example of a valuing statement and corresponding Likert response options follows. "I am comfortable debating issues within a team." The student would then select either to a very great extent (6), to a great extent (5), to a moderate extent (4), to a small extent (3), to a very small extent (2), not at all (1), not applicable (0).

Data analysis plan.

Initial review of descriptive statistics for the data indicated there were missing data in the data set. Research data that involve human subjects is prone to contain an element of missing data. This is particularly common when self-report measures are used for data collection (Penny & Atkinson, 2011), as was the case in this study. Traditionally, a common strategy for dealing with missing data has been excluding cases (Baraldi & Enders, 2010). Listwise deletion can be advantageous because it yields a complete data set. Complete data sets lend themselves to standard statistical analyses.

Modern missing data techniques are recommended in lieu of excluding cases (Baraldi & Enders, 2010; Penny & Atkinson, 2011; Graham, 2009). Multiple imputation is a preferred modern missing data technique because it produces unbiased estimates (Baraldi & Enders, 2010). Estimates of the means and covariances are used to construct a set of regression equations that predict the missing variables from the complete variables (Baraldi & Enders, 2010). Furthermore, multiple imputation uses a number of filled-in data sets to account for the uncertainty in the missing data (Baraldi & Enders, 2010).

Multiple imputation can be performed at the item or scale level. In this analysis, multiple imputation was performed at the item-level. Choice of imputation approach has been shown to have no influence on the bias of scale-level parameter estimates (Gottschall, West, & Enders, 2012). Choice of item versus scale level imputation however, can have a substantial impact on efficiency (Gottschall et al., 2012). Item-level imputation produces a meaningful power advantage over scale level imputation estimates (Gottschall et al., 2012). In addition, consultation with a biostatistician yielded a recommendation for modifying the data analysis plan to include modern missing data analysis methods, specifically multiple imputation.

Data analysis included path analysis, a form of structural equation modeling, with change score modeling. Path analysis involves specification and depiction of path models or structural models to depict the relationship between observed variables (Kline, 2015). The path model used in this data analysis is depicted in figure 1.

Latent change score modeling is a technique to study change and time-sequential associations across individuals (Grimm, Ram, & Estabrook, 2017). This study lends itself to understanding within-person change and latent change score models emphasize

within-person change (Grimm et al., 2017). Latent change score models make time-dependent change the outcome of interest. The latent change scores are created by paths between the repeated measures of the ISVS tool. In this study, the null hypothesis was that the change score between pre and post course ISVS is zero, indicating that no change had taken place.

Provision for the protection of human rights.

In order to ensure protection of human rights, Institutional Review Board approval was sought for this study. The protocol was granted exempt status, Appendix C. The potential for distress as a result of participation was anticipated to be no more than what the subjects would experience in their daily lives as students. Subjects had the right to withdraw from the study at any time without penalty. Confidentiality was maintained throughout the study. Subjects were assigned a non-identifiable identification number. The study database was stored on a password protected laptop. Consultation with the university regarding compliance with Family Educational Rights and Privacy Act (FERPA) was conducted and all recommendations adhered to. In addition, student grades were not affected whether or not they choose to participate. The course faculty member was not aware whether an individual student participated in the research project or chose to opt out.

Limitations.

Though every effort was made to ensure methodological rigor in this practical clinical trial proposal, there were limitations to the study. First, the researcher recognizes that it was crucial to ensure intervention fidelity between the separate semesters and sections of instruction within the Palliative Care course. The researcher met with the

course faculty member and the course faculty member supported the research project. In addition, ongoing monitoring of usual care to ensure the same course delivery in each of the semesters of instruction was conducted. To this end, the budget included time for ongoing consultation with the course faculty member.

A third limitation to the proposal was intervention generalizability. There were some anticipated limits to the ability to generalize findings from this study to general IPE work. IPE modules can vary widely in the content delivered and, similar to this proposal, couch teamwork, communication, and collaboration training within the context of specialty specific content. Therefore, the ability to generalize to other interprofessional training within the context of a different specialty area may be limited. Yet, despite these limitations, this study was needed to understand if students value the contributions and role of interprofessional team members differently when they learn about providing team-based care in a cohort of learners from their own discipline versus with a cohort of mixed discipline peers.

CHAPTER 4 & 5

Results & Discussion

The manuscript option is a modified version of the traditional dissertation in which a minimum of two manuscripts replace selected sections of the traditional dissertation. The two manuscripts are included below.

Concept analysis of interprofessional socialization

Abstract

Aim

To report an analysis of the concept of interprofessional socialization.

Background

Health care has entered an era of interprofessionalism in education and patient care. Interprofessional health care teams are challenged to perform cohesively to provide high-quality patient care. Previous models of discipline-specific socialization are at a minimum insufficient to prepare professionals for interprofessional patient care and in fact may impede interprofessional team efforts. A re-envisioning of health professional socialization to an emphasis on interprofessional socialization as a strategy to prepare interprofessional teams is needed. However, interprofessional socialization is neither clearly defined, nor consistently incorporated into descriptions of professional education.

Design

Rodger's method for concept analysis was used to form a rich, clear, and useful description of interprofessional socialization.

Data Sources

Multiple databases including PubMed and CINAHL were searched with no beginning date restriction through December, 2014. A keyword search method was employed followed by a combined keyword search. In addition, ancestral searching was performed.

Methods

A concept analysis based on Rodger's method was carried out using 32 articles. Examination of the articles identified attributes, antecedents, and consequences of interprofessional socialization.

Results

The results yield a description of interprofessional socialization with five component attributes: building interprofessional awareness, experiential learning, managing professional role/team expectation congruence, valuing, and evolving knowledge, skills, and attitudes.

Conclusion

Understanding the nature as well as key attributes of the concept will assist with analyzing the current socialization of interprofessional teams and help to determine strategies to impact future interprofessional socialization initiatives.

Summary Statement

Why is this research or review needed?

- Interprofessional health care teams are challenged to perform cohesively to provide high-quality patient care.
- Interprofessional socialization impacts the functioning of health care teams.
- A rich, clear, and pragmatic concept analysis of interprofessional socialization is needed to frame interprofessional education strategies.

What are the key findings?

- The concept of interprofessional socialization contains five component attributes: building interprofessional awareness, experiential learning, managing professional role/team expectation congruence, valuing, and evolving knowledge, skills, and attitudes.
- Antecedents of interprofessional socialization include pre-professional socialization, individual intrinsic factors, and professional education.
- Consequences of interprofessional socialization are interprofessional relations yielding reciprocity in decision making and power, equipped with the communication and collaboration skills necessary to impact outcomes, in particular improved patient safety.

How should the findings be used to influence policy/practice/research/education?

- Interprofessional socialization should be included in the design of interprofessional education strategies to improve the functioning of health care teams.
- This concept analysis should frame and guide further research in interprofessional socialization methods.

Keywords

Concept analysis, nurses/midwives/nursing, interprofessional socialization, socialization, interprofessional education.

Introduction

Health care has entered an era of interprofessionalism in education and patient care. Interprofessional teamwork and communication matter to patient outcomes and safety (Donchin et al., 1995; Manojlovich & DeCicco, 2007). Though health professionals are tasked to perform cohesively on high functioning teams once in practice; interprofessional teams are not systematically educated together in patient care or teamwork skills. Interprofessional socialization (IS) is an important component of developing positive, collaborative interprofessional relations in healthcare delivery (Khalili, Orchard, Spence Laschinger, & Farah, 2013). The emphasis on IS is a relatively new development and IS is neither well understood nor consistently incorporated into descriptions of professional education. Effort is needed to define and clarify IS as a concept as well as to elucidate the evolution of IS historically and ultimately utilize its full potential to improve interprofessional relations. This paper is therefore a timely and necessary concept analysis on the topic of IS.

Background

Each healthcare profession has discipline-specific educational programs, cultures, values and beliefs. This isolated approach can contribute to a lack of communication and collaboration among health professionals (Hudson et al., 2013). The effects of poor communication and decreased collaboration between healthcare providers have been well documented. Poor communication and collaboration lead to increased risk of medical errors, decreased nursing job satisfaction, decreased patient satisfaction and poorer patient outcomes (McCaffrey et al., 2012).

A seminal study done in a critical care setting found that communication between physicians and nurses was the most significant factor associated with patient mortality (Knaus et al., 1986). Recent studies have continued to confirm the importance of healthcare team dynamics, finding that as nurses' perceptions of factors in the practice environment and communication with physicians increased, medication errors decreased (Manojlovich & De Cicco, 2007). In addition, the Joint Commission and Institute for Healthcare Improvement emphasize the role of interdisciplinary communication to patient safety. The Institute of Medicine (IOM)'s 2003 report, *Health Professions Education: A Bridge to Quality* highlighted that though health professionals are tasked to perform cohesively on high functioning teams once in practice, interdisciplinary teams are not educated together. In particular, the need for collegial nurse-physician relationships has been highlighted (Schmalenberg & Kramer, 2009).

Successful IS programs offer strategies to improve interprofessional education design and ultimately, healthcare team performance and interprofessional relations (Bjorke & Haavie, 2006; DiVall et al., 2014). Interprofessional practice demands that healthcare professionals extend their professional socialization to embrace dual professional and interprofessional identities (Kinget al., 2010; Bartunek, 2011). IS enables team members to develop and embrace interprofessional identities beyond the professional identity developed in professional education. Clarification and refinement of the attributes, antecedents, and consequences of IS can provide a much needed guide for nurses and researchers to contribute to and advance the body of knowledge in IS. Therefore, this concept analysis of IS is a necessary foundation to frame IS and support its application in professional and interprofessional pre- and post-licensure education.

Concept Analysis Methodology

The Rodgers framework for conducting concept analysis will be used as the guiding methodology. Rodgers' process of concept analysis values an evolutionary view (Rodgers, 2000). Concept use and definition is dynamic and most valuable in identifying common and unique contextual factors that shape the use of the concept. The evolutionary approach is particularly salient to IS because it acknowledges that definition, evaluation, and refinement of a concept are influenced heavily by the social and cultural contexts within which it has been used over time. In addition, the interdisciplinary nature of the evolutionary approach is further support for selection of the Rodgers model (Rodgers, 2000).

There are six steps in Rodgers' method of evolutionary concept analysis. First the researcher identifies the concept of interest and associated expressions including surrogate terms. Second, the appropriate setting and sample for data collection needs to be selected and identified. Third, relevant data are collected to identify the attributes of the concept and the contextual basis of the concept, including interdisciplinary, sociocultural, and temporal variations such as antecedent and consequential occurrences. Next, the research analyzes the data identified in the third step. The researcher continues by identifying an exemplar of the concept. Before the final step, the work of the researcher is to interpret results. Finally, implications, hypotheses and implications for further development of the concept need to be identified. In practical application of this model, many of the steps are carried out simultaneously throughout the investigation (Rodgers, 2000). However, to facilitate transparency of the methodology, each step will be discussed separately.

Concept of Interest

The identified concept of interest is interprofessional socialization. The term selection was complicated by use of related, though not synonymous terminology. Examples of related, though excluded terminology include: professional socialization, interprofessional education, interprofessional learning, interdisciplinary, multidisciplinary, and enculturation. Professional socialization was excluded to focus on the socialization specific and necessary to the interprofessional nature of health care teams. Interprofessional education and interprofessional learning are terms used to describe education offerings directed at interprofessional students or audiences. Though interprofessional education and interprofessional learning offer one strategy for IS, they are limited in scope and do not encompass the totality of the process of IS. Enculturation was also considered for term selection. Though enculturation is related to, it is not synonymous with socialization. Socialization more robustly reflects the deliberate process of shaping of the individual. In other words, the socialization can include both deliberate and informal enculturation.

Of additional import is to elicit the historical trajectory of emergence of the concept of IS. The value of and emphasis on the interprofessional nature of socialization to healthcare teams has been a fairly recent development. Examining the impetus and timeframe for emergence may provide additional insight into the context of IS. However, the primary goal of the concept analysis remains to define and clarify the concept of IS to support its application in professional and interprofessional pre- and post-licensure education.

Data Sources

Literature retrieval using health science databases was used as the primary data source for analysis. PubMed and CINAHL databases were searched without date restrictions. The strategy to not include date restrictions was employed to support the secondary goal of determining the historical onset of use of the concept of interprofessional socialization. The search was limited to English text only. The search terms applied were interprofessional socialization, interprofessional relations AND socialization, interprofessional AND socialization. This search strategy yield 57 results from CINAHL and 379 results from PubMed. Subtracting for duplicate sources, the total article data yield was 416. Next, all abstracts were reviewed for relevance. Priority was given to articles focusing on interprofessional instead of professional specific socialization. Socialization strategies in both educational and practice settings were included. Articles were purposefully not restricted solely to nursing and medicine fields. Instead, a breadth of representation was sought including social work, health education and other health disciplines. Review of abstracts narrowed the article field to 54 data sources. Full text of each of these 54 articles were obtained and reviewed for relevance. Twenty-six total articles met the relevance criteria for inclusion. To supplement data, ancestral searching was also performed, yielding an additional six articles for data inclusion. The total number of articles included in the concept analysis is therefore 32. A pictorial representation of this source selection and refinement is depicted in Figure 1.

Results

Contextual basis

The first key finding is that data portray changes in the concept over time. One important contextual consideration is that IS emerged as different and separate from the concept of professional socialization. Historically earlier emphasis on professional socialization yields to sources richer in discussion of interprofessional socialization.

In the early 1990s, the description of an autonomous and independent professional being socialized to provide expert care begins to change. The representation of multidisciplinary, professionally socialized care providers begins to give way to the import on valuing the contributions of other professions (Davies, 2002). Themes of dual professional and interprofessional identities begin to permeate the discussion of IS (Khalili et al., 2013).

In addition, sources portray that IS happens in an interprofessional practice environment. The context of the interprofessional environment has an important influence on the progression of development to the concept of IS. Therefore, interprofessional practice within the culture of the organization and environment of healthcare delivery sets a crucial context for IS (King et al., 2010). Individual hospital and unit cultures will thereby impact interprofessional relations and can therefore either support or hinder IS. This is depicted by the contextual environment of culture surrounding IS in the pictorial representation of the concept (Figure 2). The organizational culture and subsequent formative early workplace experiences are important contexts that shape interprofessional attitudes (Veerapen & Purkis, 2014).

Antecedents to IS

Several important antecedents to IS emerge in review of the literature. These antecedents are pre-professional socialization, individual intrinsic factors, and professional education. Pre-professional socialization begins prior to an individual's professional education. Socialization to healthcare professions begins in childhood and is shaped by cultural and societal contexts (Khalili et al., 2013). Many students have developed an interpretation of their chosen career before entering their professional education; indeed this understanding may aid in selection of their area of study from between other competing and related professions (Khalili et al., 2013). Beliefs acquired through pre-professional socialization input contain myths and prejudicial attitudes that need to be reformulated with IS. Unfortunately, these pre-professional, anticipatory beliefs are well-ingrained and formidable to overcome (Khalili et al., 2013; Michalec et al., 2013).

A second antecedent to IS is professional education. Professional education is the discipline specific education and training an individual completes to practice in their discipline. Professional education refers to formal efforts to provide information and experience and develop new skills and competencies among students (IOM, 2003). Socialization to healthcare roles continues during an individual's professional education when the student negotiates his/her identification with and fit within the chosen profession (Arndt et al., 2007). Professional education extends beyond higher education curriculum and can include formal, on-the-job training efforts to develop skills and competencies. At the completion of their professional education, students will have

mastered not only the skills and values of their profession but also its professional identity (Hall, 2005).

Challenges arise as a result of the current model of professional education delivery. Knowledge needed to provide safe patient care is complex. The complex skills required of health care providers has resulted in increased specialization in health care professions and few opportunities to interact with other professions during formal education requirements (Hall, 2005). Historically, this educational model has built and reinforced a siloed, separatist culture among health professionals (Hall, 2005). As a product of being educated separately, unintended consequences, such as stunted team communication, have permeated (Hudson et al., 2013).

There are several barriers to true IS imbedded in our current model of professional education. One such barrier is that professional socialization is emphasized rather than IS. Professional socialization affects the way different health professional groups view themselves. For example, physicians report themselves as team leaders and decision makers while other health disciplines such as nursing and therapists report themselves as team members (Hall 2005; Horsburgh et al., 2006; Baker et al., 2011).

Additional barriers embedded in our current model of professional education include closure and the rotational model of clinical experience. Closure is performed to secure and protect areas of expertise and knowledge in professional practice and appears to be deeply rooted in the professional socialization of healthcare professionals (Baker et al., 2011; Khalili et al., 2013). A final barrier embedded in professional education includes the rotational model of clinical experience. Frequent transitions may impede or delay adequate socialization and interprofessional relationships (Holmboe et al., 2011).

A final antecedent to IS is individual characteristics. People bring with them personal factors intrinsic to the individual. These personal factors include interprofessional beliefs and behaviors and an individual's affinity for either an individualistic or collectivistic orientation (Khalili et al., 2013). A collectivistic orientation may predispose the individual to more readily accept and engage in interprofessional interactions.

Attributes of the Concept

A concept is defined as a cluster of attributes (Rodgers, 2000). To examine the concept of IS, discovery and discussion of its component parts is necessary. Importantly, IS is best conceptualized as a process concept. Process concepts may not have a clearly identifiable beginning or end point (Rodgers, 2000). As will be described, it is certainly the case in IS that there is no clearly identified beginning or end point. Therefore, verbs are chosen to reflect the process nature of socialization; it is most accurately modeled as continuous, dynamic rather than static.

Rigorous analysis of the articles selected in the literature search was conducted to identify and illuminate the constituent components of IS. Results of the data analysis indicate there are five necessary attributes of IS. These attributes are: building interprofessional awareness, experiential learning, managing professional role/team expectation congruence, valuing, and evolving knowledge, skills, and attitudes.

Building interprofessional awareness.

Awareness of one's behavior and interactions with others on the interprofessional team are necessary foundational aspects of IS (King et al., 2010). A subcomponent part of building interprofessional awareness is interprofessional familiarization. In interprofessional familiarization, the goal is to introduce students to the roles and

functions of other professionals outside their own (Arndt et al., 2007). Ideally, interprofessional familiarization begins before one's initiation in professional practice and is best commenced during one's professional education.

Though building interprofessional awareness should begin in one's professional education, it is not consistently implemented nor systematically embedded in professional education curriculum (Arndt et al., 2007). Building interprofessional awareness extends beyond the familiarization process of being introduced to roles and functions of other professions. Building interprofessional awareness is centered on articulating the differences among professions, establishing and understanding these differences, and determining where one fits in relation to other health care professionals (Arndt et al., 2007).

Interprofessional awareness includes understanding other members' scopes of practice.

Accurate conceptualization of scopes of practice is particularly important because a lack of recognizing can be perceived by colleagues as disregard for, and devaluing of, other professions (Baker et al., 2011). Building interprofessional awareness is an appropriate and descriptive label to depict the process nature of this attribute. Often at initial interprofessional team exposure, individuals exhibit a low appreciation of the importance of interprofessional relations. As the number and depth of clinical team experiences grow, individuals exhibit an increased awareness of the value of interprofessional relations (Bjorke & Haavie, 2006)

Experiential learning.

Experiential learning is a necessary attribute for IS because a member of a profession-specific discipline must not just theoretically learn about the importance of peer members of the interprofessional team, they must engage in experiential learning to fully participate as an interprofessional team member. Interaction is enhanced when members work together within a stable group, with minimal turnover in terms of established members leaving and new people joining the group (Reeves et al., 2007). There is a destabilizing effect in the lack of fixed teams and temporary relationships typical in hospital environments and educational rotations (Veerapen & Purkis, 2014). In addition, an equal mix of professionals' perspectives and contributions is crucial because a group skewed too heavily in favor of one profession can inhibit interaction as the large professional group can dominate perspectives (Reeves et al., 2007).

Experiential learning can be delivered in a variety of contexts. One of these contexts is clinical communities of practice. Communities of practice are defined as a set of relations among persons, activity, and world over time and in relation with other tangential and overlapping communities of practice (Ajjawi & Higgs, 2008). There is significance in belonging to such communities because practitioners construct identities as members of a community of practice (Ajjawi & Higgs, 2008). Workplace learning emphasizes the mutual interdependence between a workplace and its team. Themes of participation and belongingness emerge as needed during experiential learning (Liljedahl et al., 2014). This may require more than simulated interprofessional interactions or case scenarios but rather a contributive environment that begins with the onset of one's own

practice. In experiential learning, interactions between individuals are crucial for interprofessional growth.

Another context for experiential learning is interprofessional education modalities. Interprofessional education is described as learning that occurs across two or more professions, is interactive in nature, involves reflection, and whose outcomes include collaboration between students of these professions (Thistlethwaite & Nisbet, 2007). Strategies for interprofessional education can include emphasis on communication and collaborative practice (Hudson et al., 2013). While interprofessional education programs are one context for experiential learning, it is neither the entirety of experiential learning nor sufficient to ensure IS.

An additional benefit of the broader attribute of experiential learning is that interprofessional interactions are perceived as more relevant to the individual. Reactions to interprofessional immersion are more favorable when participants see a direct relevance to current practice (Reeves et al., 2007). When shared and valued, experiential learning facilitates the sharing of knowledge, understanding, and experience needed for positive IS (Rogers 2010; Veerapen & Purkis, 2014). These shared, formative experiences build the collaborative values and attitudes needed in interprofessional teams. Therefore, it is evident that there is a primacy and necessity of experiential learning to support IS.

Managing professional role/team expectation congruence.

Managing professional role and team expectation congruence is the extent to which an individual is successful in maintaining a collaborative interprofessional identity in their ongoing practice despite potentially conflicting demands and contingencies of the

workplace (Veerapen & Purkis, 2014). The term ‘reality shock’ has been used to describe the powerful experience of healthcare professionals upon discovering that their initial education is in conflict with work world realities (Wilson & Startup, 1991). Therefore, the individual is challenged when faced with a reality that is divergent and conflicting with their anticipated and closely guarded role expectations.

To begin the process of managing professional role and team expectation congruence, individuals first must articulate their professional identity and role within an interprofessional health care environment (Arndt et al., 2009). In addition, a clear understanding of the professional roles and responsibilities of others is essential to collaborate for effective patient care (Arndt et al., 2009). Therefore, individuals must see both where commonalities lie and be able to discern the unique contributions of the “other” on an interprofessional team.

After understanding the commonalities and distinct differences in group roles, professional role and team expectations congruence continues to be supported by and sustained in group membership (Willetts & Clarke, 2013). The salience of a particular role identity is dependent on the group context (Willetts & Clarke, 2013). An individual’s expectation of his/her professional role changes and evolves based on the applicability to the reality of role expectations in the care environment. For example, an organization depends on its employees to engage in spontaneous acts of cooperation, helping, and innovation and not simply enact a role as professionally taught (Willettts & Clarke, 2013). There are associated choices in behavior and therefore role expectation congruence to manage. This can be a challenge for the newly practicing professional who, during a period of shock and change, seeks to hold to comfortable role identities.

During the period of managing role and team expectation congruence, the individual may be faced with conflict in their health care practice environment. Conflict can arise between health care professionals or in the potentially conflicting demands and contingencies of the workplace (Veerapen & Purkis, 2014). Resilience to team conflicts is the individual's ability to bounce back or cope successfully despite adverse circumstances (Hart et al., 2014).

Valuing.

Valuing encompasses the individual's evolving appreciation and understanding of the import of a collaborative team approach (King et al., 2010). Individuals must see meaning and worth in working with others and appreciate the benefit of an interprofessional approach to healthcare delivery. At the most cursory level, positive messaging about the value and contribution of all members of the health care team is needed to negate historical stereotypes (Price et al., 2014). This messaging begins with hospital websites, communication materials and all social media reflecting a culture of interprofessional collaboration. Attention to how the various health professionals are presented and imaged within communications is essential to ensure that historical hierarchies within the system are not perpetuated (Price et al., 2014). Valuing begins with altering messaging to improve negative stereotypes of the interprofessional relationship, however it is theorized to be easier to alter negative stereotypes and more difficult to enhance neutral or positive ones (Rogers, 2010).

Beliefs about and awareness of one's interactions with others in the interprofessional group are important and necessary components of IS. Valuing deepens when groups are brought together under conditions that increase understanding. The beliefs and attitudes

of professionals influence and are influenced by their interactions in collaborative care approaches (King et al., 2010). Acquiring and valuing an interprofessional mindset can be fostered and beliefs about the importance of interprofessional practice enhanced. Examples of perspectives valuing interprofessional practice include gaining an appreciation for the benefits of interprofessional team work and initiating discussion about sharing responsibility for client care (King et al., 2010).

Evolving knowledge, skills, and attitudes.

There are a variety of models that articulate the knowledge, skills, and attitudes required for practicing on interprofessional health care teams (Arndt et al., 2009). Indeed, these interprofessional knowledge, skills, and attitudes are not static; they are a set of tools that can be learned, developed and fostered.

Interprofessional education programs presented both during and after formal professional education offer strategies to develop interprofessional knowledge, skills, and attitudes. The goal of interprofessional education is for students to learn how to function as part of an interprofessional team and incorporate the knowledge, skills, and attitudes of interprofessional education into their future practice, ultimately providing better quality and safer patient care through interprofessional collaboration (Baker & Durham, 2013). Interprofessional education initiatives have shown positive results in improving participants' collaborative competency outcomes of improved communication, improved collaboration, improved grasp on roles and responsibilities, improved collaborative patient- and family-centered approach, improved conflict management and resolution, and improved team functioning (Baker & Durham, 2013).

The knowledge, skills, and attitudes needed for interprofessional practice can be categorized within a patient safety framework. The interprofessional patient safety domains include that the interprofessional team member contributes to a culture of patient safety, works in teams for patient safety, communicates effectively for patient safety, manages safety risks, optimizes human and environmental factors, and recognizes, responds to, and discloses adverse events (King & Anderson, 2012).

Further research will be necessary to come to a conclusive and all-inclusive catalog of the needed competencies that comprise the knowledge, skills, and attitudes necessary for interprofessional practice. For the purposes of the concept analysis of IS, it is imperative to frame these as evolving knowledge, skills, and attitudes. The purposeful selection of the term "evolving" reflects that the interprofessional team member must stay abreast and current in responding to the developing nature of team based care and the progress of advancing competencies.

A variety of factors influence the development and success of interprofessional knowledge, skills, and attitudes. These factors include learner-focused factors, faculty-focused factors, and organization factors (Reeves et al., 2007). Some learner focused factors include promoting interprofessional interaction, group dynamics and relevance and status (Reeves et al., 2007). Faculty focused factors are expert facilitation and facilitator support and training (Reeves et al., 2007). Finally, organization focused factors are organizational implementation and organization support (Reeves et al., 2007). These domains of focus on the learner, faculty and organization have implications for designing interventions meant to improve interprofessional knowledge, skills, and attitudes.

In summary, there are five key essential components of IS. The attributes of becoming interprofessionally aware, experiential learning, managing professional role and team expectation congruence, valuing and evolving knowledge, skills, and attitudes comprise IS. The attributes all exist in a dimension of culture, specifically the culture of the health care organization within which the interprofessional team is practicing. This culture needs to create a climate for trusting interprofessional relationships (Khalili et al., 2013). Current culture has perpetuated multidisciplinary care where each professional works somewhat independently to meet their own profession-identified care goals (Khalili et al., 2013). A cultural shift will require joint curricula and sharing of resources supported by both human and fiscal resources.

Consequences

There are four major theorized consequences of IS: interprofessional collaboration, communication, team interdependence and reciprocity, and patient safety. IS strategies prepare interprofessional team members with the communication and collaboration skills necessary to improve interprofessional team relationships (Baker & Durham, 2013). Participants demonstrate development and improvement of interprofessional and collaborative competencies after engaging in IS efforts (Baker & Durham, 2013).

IS impacts interprofessional team interdependence and reciprocity in decision making and shared power. After completing formal professional education programs, individuals emerge with divergent views of decision-making and power. These can be reshaped through IS. For example, participating in group decision-making and planning requires each member to shift from his/her specific professional focus to a framework requiring interdependence (Hall, 2005).

Finally, IS improves patient outcomes. This is because at the heart of safe cultures are effective interactions within and between interprofessional teams (Paradis et al., 2013). Both interprofessional communication and collaboration impact patient outcomes (Zwarenstein et al., 2009). The extent to which different healthcare professionals collaborate has been shown to affect the quality of the health care that they provide (Zwarenstein et al., 2009). In addition, how healthcare professionals communicate and interact with each other can impact patient care (Zwarenstein et al., 2009).

Discussion

The complexity of health care necessitates interprofessional practice among a diverse team of providers. Interprofessional practice offers significant promise from past multi-disciplinary models of health care delivery. In the multidisciplinary mode, each discipline offered care perspectives independently, in parallel to one another (King et al., 2010). In the evolution towards interprofessional teams, team members reach consensus about intervention goals and the client is integral as center to the team (King et al., 2010). To facilitate the change toward interprofessional practice, a revised focus from professional socialization to an emphasis on the importance of IS is paramount. Developing knowledge, skills and positive attitudes about IS has the ability to transform our interprofessional team relations, resulting in high functioning health care teams equipped to meet and exceed the challenges of team-based health care delivery.

Illuminating the components of IS through concept analysis provides pragmatic opportunities for nursing research and nursing education. Traditionally in nursing, socialization research has focused on how nursing students are inducted into the culture of the profession of nursing, molding nursing students through didactic classroom and

clinical placement experiences. The concept analysis presented on IS provides a framework for designing socialization research that is consistently interprofessional in nature. Research questions in need of investigation include when and where IS programs should occur as well as effort needed in investigating how to best systematically apply IS across diverse education and practice organizations. Arbitrary implementation of and disparate value placed on IS may result in underdevelopment of interprofessional competencies.

Limitations

There are several imitations of this analysis. First, data analysis was conducted by one primary investigator. Data review by a second investigator would provide increased reliability and enhance rigor. A second limitation to consider is the relative lack of articles with IS as the sole or primary investigative focus. Most often, IS was a secondary component of investigation under a primary research focus on interprofessional education. Therefore, discussion and investigation of IS as a focus was less than optimally robust. The deficiency in directly applicable source materials reveals the need for primary research emphasizing the IS process.

Conclusion

In conclusion, this present analysis of the literature revealed the conceptual structure of IS in its antecedents, attributes, and consequences. The five essential attributes are becoming interprofessionally aware, experiential learning, managing professional role and team expectation congruence, valuing and evolving knowledge, skills, and attitudes. The important antecedents to IS to consider are pre-professional socialization, individual intrinsic factors, and professional education. Finally, the consequences of IS include

interdependent teams, reciprocity in decision making and power, interprofessional teams equipped with the communication and collaboration, and consequences to patient outcomes, in particular improved patient safety.

Health care team members need to develop interprofessional identities through IS to optimally engage in interprofessional practice. The concept analysis of IS provided a guide for examining the operationalization and outcomes of IS strategies and experiences of participants exposed to interprofessional education and practice. A thoughtful, concept-driven approach to IS is formative to foster the interprofessional competencies required for collaborative interprofessional care.

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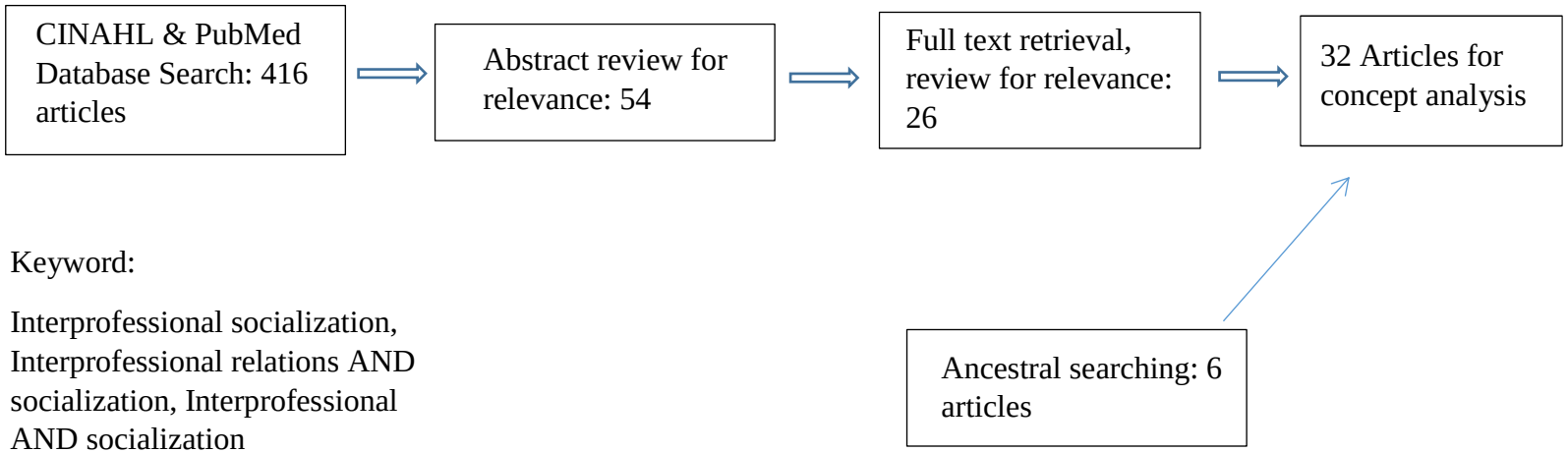
Figure 1: Data Collection Setting and Sample

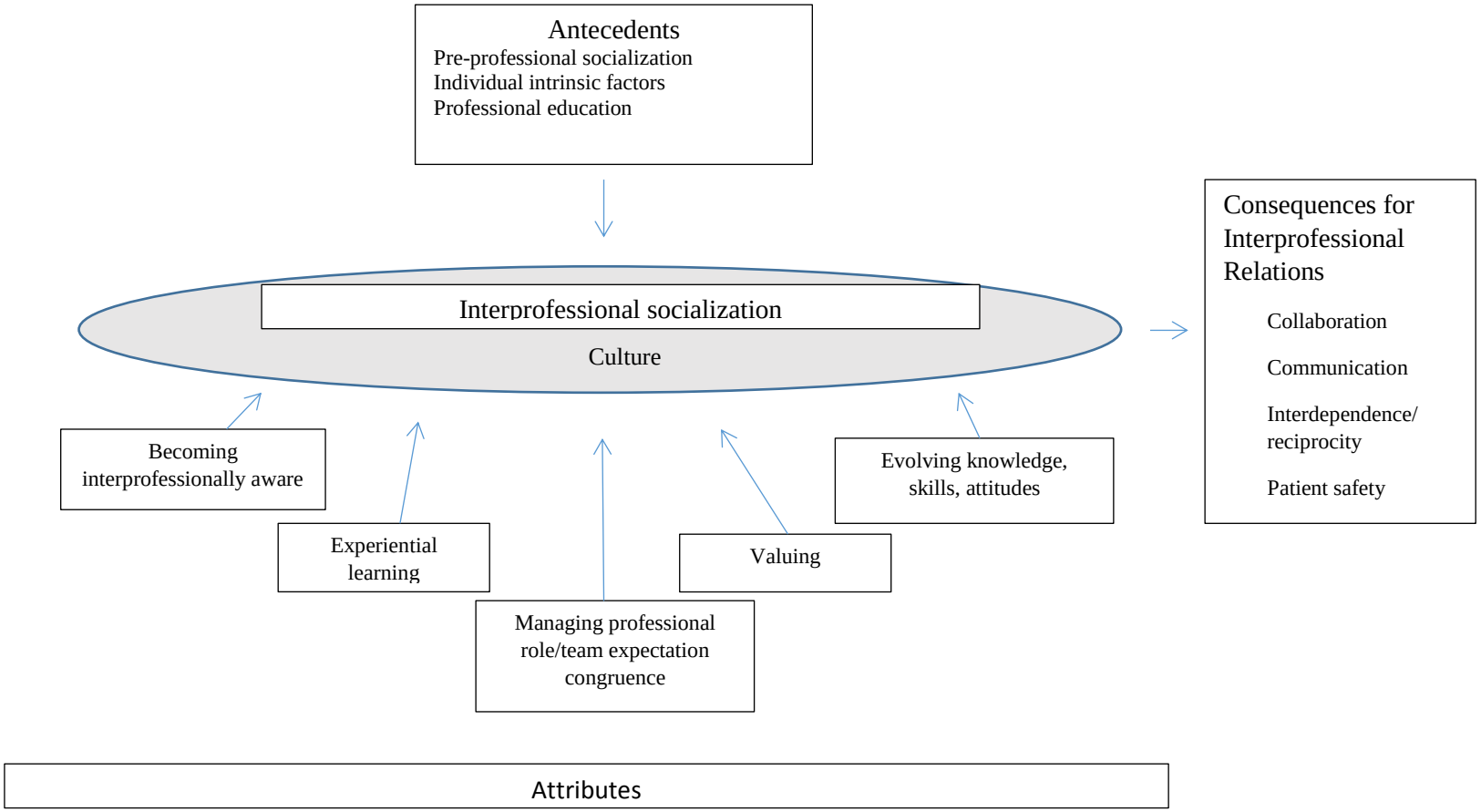


Keyword:

Interprofessional socialization, Interprofessional relations AND socialization, Interprofessional AND socialization

Restrictions: English only

Figure 2: Organization and relationships among IS attributes, antecedents, and consequences



COMPARING INTERPROFESSIONAL SOCIALIZATION IN MIXED DISCIPLINE AND NURSING STUDENT ONLY COHORTS

by

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Keywords: Interprofessional socialization, interprofessional education, change score modeling

Abstract

A main cause of patient safety incidents are avoidable failures in communication between health professionals. In response, healthcare has entered an era of interprofessionalism in education and patient care. A challenge to substantiating the value of interprofessional education (IPE) has been a limited number of studies that assess the effectiveness of IPE interventions compared to education interventions in which professions were learning separately from one another. This research project helps fill this gap and measures the differences in student interprofessional socialization (IS) between an IPE cohort and a usual care group of single-discipline learners. The purpose was to compare IS in mixed-discipline and single-discipline only student cohorts and to determine if mixed-discipline students demonstrate greater improvement in IS compared to single-discipline cohorts of students. Statistically significant increases in IS were seen with all participants, in individual cohorts and in all IS subscales both with all participants and individual cohorts. No difference was observed between a cohort of nursing student only learners versus a cohort of mixed discipline students. The study demonstrates that IS can be significantly increased through well designed learning in teamwork and collaboration whether students participate with single discipline peers or mixed discipline settings.

The costs of patient harm are devastating. There are immense personal costs to the patient, their family and the healthcare team. Estimates vary, but one in ten patients have been reported harmed during hospitalization (Tingle, 2017). Adverse events are estimated to be the 14th leading cause of morbidity and mortality in the world (Slawomirski, Auraaen, & Klazinga, 2017). A main cause of patient safety incidents are avoidable failures in communication between health professionals (Tingle, 2017) and about half of medical errors are considered to be preventable (Freytag, Stroben, Hautz, Eisenmann, & Kammer, 2017).

In response, health care has entered an era of interprofessionalism in education and patient care. Interprofessional teamwork and communication improve patient outcomes and safety (Donchin et al., 1995; Manojlovich & DeCicco, 2007). The effects of poor communication and decreased collaboration between healthcare providers have been well documented. Poor communication and collaboration lead to increased risk of medical errors, decreased nursing job satisfaction, decreased patient satisfaction and poorer patient outcomes (Knaus, Draper, Wagner, & Zimmerman, 1986; Manojlovich & De Cicco, 2007; McCaffrey et al., 2012).

Most health profession education is currently delivered in a traditional, discipline specific way (Lapkin, Levett-Jones, & Gilligan, 2013). Each healthcare profession has discipline-specific educational programs, cultures, values and beliefs. This isolated approach can contribute to a lack of communication and collaboration among health professionals (Hudson, Sanders, & Pepper, 2013). Though health professionals are tasked to perform cohesively on high functioning teams once in practice, interprofessional teams are not systematically educated together in patient care

or teamwork skills (Institute of Medicine, 2003). Since this seminal Institute of Medicine (IOM) report, there have been increased efforts to design and implement interprofessional education (IPE) initiatives. The emphasis on IPE continues; a recent subsequent IOM report emphasizes the need to more effectively link IPE with changes in collaborative behavior (IOM, 2015).

Interprofessional socialization (IS) is an important component of developing positive, collaborative interprofessional relations in healthcare delivery (Khalili, Orchard, Spence Laschinger, & Farah, 2013). As such, the attributes of IS should be included in the design of health care student education strategies to ultimately improve the functioning of health care teams. Programs that include IS efforts offer strategies to improve IPE design and ultimately, healthcare team performance and interprofessional relations (Bjorke & Haavie, 2006; DiVall et al., 2014). Research is needed to measure how the design of IPE impacts students' IS and in turn how IS can be incorporated into IPE to improve collaborative outcomes.

Though IPE is widely seen as a strategy to improve the ability to equip health profession students with the knowledge, skills, and attitudes necessary for effective team based care (Lapkin et al., 2013), designing, implementing, evaluating, and disseminating interprofessional education carries significant costs. Barriers to IPE implementation include scheduling challenges, difficulty in matching students of compatible level, limitations in faculty and staff time, insufficient funding, and inadequate administration support (Abu-Rish et al., 2012). Therefore, persuasive evidence is needed to justify the need for IPE.

Despite the fact that the number of studies focusing on IPE has grown since the 2003 IOM report, the evidence demonstrating outcomes from interprofessional initiatives is underwhelming. A challenge to substantiating the value of IPE has been a limited number of studies that assess the effectiveness of IPE interventions compared to education interventions in which the same professions were learning separately from one another (Reeves et al., 2010b). In fact, one systematic review found no studies where researchers were able to assess the effectiveness of IPE interventions compared to education interventions where disciplines engaged in learning separately (Reeves et al., 2010b).

Instead, IPE has been deemed effective with IPE interventions compared to control groups which received no educational intervention. Therefore, additional study is needed to establish IPE efficacy beyond comparing knowledge, skills, or collaborative attitudes for an interprofessional group to a group of students who received no planned learning or intervention. IPE outcomes need to be compared between mixed-discipline learners receiving an IPE intervention and a group of single-discipline students learning principles of collaborative teamwork as part of their professional training or usual care. This research project helps fill this gap noted in systematic reviews of IPE initiatives and measures the differences in student IS between an IPE cohort and a usual care group of one-discipline learners.

An emphasis on IPE was ignited following seminal works in the patient safety movement. Beginning with *To Err is Human* (IOM, 1999), attention was given to the critical number of patients harmed from preventable medical errors. Focus was given to

the role of human factors in medical errors. A human factors approach was encouraged to help understand where and why systems or processes were breaking down and causing medical harm. The human factors discussion emphasized designing better systems and processes and improving communications and coordination within teams (IOM, 1999).

There continued to be an emphasis on improving patient safety through team cooperation, collaboration, and communication. The increased focus on team training led to the development of core competencies for healthcare students that highlighted the importance of working in interdisciplinary teams (IOM, 2003). The mandate became that all health professionals should be educated to deliver patient-centered care as a member of an interdisciplinary team (IOM, 2003) and IPE emerged as a predominant strategy in health professional education.

The World Health Organization (WHO) has affirmed a commitment to IPE with its Framework for Action on Interprofessional Education and Collaborative Practice (WHO, 2010). This work highlighted the importance of IPE in the development of a collaboration-ready workforce, connecting interprofessional healthcare teams to the provision of better healthcare services leading to improved health outcomes (WHO, 2010). In addition, a recent report highlights the importance of the timing, duration and relevance of IPE in promoting behavior changes among individual health professionals (Frenk et al., 2010).

A global scan of literature was performed to illuminate international trends in IPE (Rodger & Hoffman, 2010). The study was commissioned by the WHO to answer questions such as where in the world IPE occurred, how it is conducted and why it is

offered. The researchers used an internet-based survey targeting educators and researchers in 2008. The results included 396 respondants representing 41 countries. Researchers found that IPE was often voluntary (22%); not based on explicit learning outcomes (34%); not assessed for what was learned (63%); not offered by trained facilitators (69%); and not formally evaluated (30%) (Rodger & Hoffman, 2010). Participants reported many benefits of IPE for education, practice and policy. Despite limitations of relying on self-reports and an English-only, internet-based format, the authors concluded that significant efforts are required to ensure that IPE is designed, delivered and evaluated in keeping with internationally recognized best practice (Rodger & Hoffman, 2010).

In addition, multiple reviews of the IPE literature have been conducted (Abu-Rish et al., 2012; Reeves, 2009; Reeves, Goldman, Burton, & Sawatzky-Girling, 2010a; Reeves et al., 2010b; Reeves, Perrier, Goldman, Freeth, & Zwarenstein, 2013; Rodger & Hoffman, 2010; Thannhauser, Russell-Mayhew & Scott, 2010). Recent scholarly efforts have sought to substantiate the effectiveness of IPE and determine the effects of IPE on professional practice and health care outcomes (Reeves et al., 2010b; Reeves et al., 2013). The researchers determined that there has been a limited number of studies that assess the effectiveness of IPE interventions compared to education interventions in which the same professions were learning separately from one another (Reeves et al., 2010b). In fact, this systematic review found no studies where researchers were able to assess the effectiveness of IPE interventions compared to education interventions where disciplines engaged in learning separately (Reeves et al.,

2010b). Instead, IPE has been deemed effective with IPE interventions compared to control groups which received no education intervention.

An update to this work was conducted again in 2013 and published as a Cochrane Review. The researchers sought to assess the effectiveness of IPE interventions compared to separate, profession-specific education interventions and to assess the effectiveness of IPE interventions compared to no education intervention (Reeves et al., 2013). The systematic review concluded that to improve the quality of evidence relating to IPE and patient outcomes or healthcare process outcomes studies that assess the effectiveness of IPE interventions compared to separate, profession-specific interventions are necessary (Reeves et al., 2013).

The need to measure the effectiveness of IPE to a control group continues. A 2018 systematic review of the state of IPE in nursing continued to note that studies that use a control group and/or two intervention groups are needed to compare outcomes after interprofessional interventions (Rutherford-Hemming & Lioce, 2018). This research project helps fill this gap noted in systematic reviews of IPE initiatives and measures the differences in student IS between an IPE cohort and a group of one-discipline learners.

The purpose of this research project is to compare IS in mixed discipline and single discipline only student cohorts. Mixed discipline cohorts are those consisting of learners from a variety of programs of study. The aim of the proposal is to determine if mixed-discipline students demonstrate greater improvement in IS compared to single-discipline cohorts of students. This project will make an original contribution to the educational preparation of nursing and other health profession students. Health care students from all disciplines need to be prepared to engage in collaborative, team-based

health care because health team communication and collaboration impact patient outcomes. Educators need to understand if students value the contributions and role of interprofessional team members differently when they learn about providing team-based care in a cohort of learners from their own discipline versus with a cohort of mixed discipline peers.

There were two specific aims and corresponding hypotheses for this research project:

1. Does participating in an educational session that includes teamwork and collaboration principles improve students' IS?

   Hypothesis: Students will demonstrate greater IS after learning teamwork and collaboration principles.

2. Does a mixed-discipline group of students demonstrate greater improvement in IS compared to a single discipline group of students?

   Hypothesis: Mixed-discipline students will demonstrate greater improvement in IS compared to a single discipline student group.

Methods

The study design was a quasi-experimental, cohort study. The study utilized pre-test/post-test of student groups to compare in and between group IS. The research project followed a pragmatic trial approach designed to be able to quickly transfer research findings to educational practice. Consistent with pragmatic clinical trials, this research methodology used usual care as the control condition (Kovach, 2015).

The outcome variable of interest was IS. The predictor or intervention variable was the student cohort (either mixed discipline or nursing only). In addition, there were

independent variables to consider. A student demographic survey gathered information on student major, gender, and program of study (either undergraduate or graduate).

Instruments

Readiness for collaborative practice was operationalized as IS and was measured using the Interprofessional Socialization and Valuing Scale (ISVS). The ISVS was developed to quantify the beliefs, behaviors, and attitudes of students/individuals/clinicians that underlie their IS or readiness for collaborative practice in health care settings. The ISVS is a 24-item questionnaire that asks respondents to rate the extent to which a belief, behavior, or attitude is present, using a 7-point Likert scale with all points labeled as follows: 1 = not at all; 7 = to a very great extent. A "not applicable" response option was also included on the instrument. There are three subscales: self-perceived ability to work with others, value in working with others, and comfort in working with others. Higher scores indicate stronger expression of beliefs, attitudes, and behaviors reflecting/endorsing IS. Permission to use the tool was sought and granted from developers of the instrument. The ISVS was originally developed to be used in IPE initiatives as a measure of degree to which transformative learning takes place. The instrument operationalizes transformative learning socialization as changed assumptions and worldviews, enhanced knowledge and skills concerning interprofessional collaborative teamwork, and shifts in values and identities (King, Shaw, Orchard, & Miller, 2010).

The developers of the ISVS state that construct validity of the instrument was supported through principal component analysis with factor loading (King et al., 2010). The criteria for retaining items were a factor loading of at least 0.30, and (b) if an

item loaded on two factors, then a minimum difference of 0.10 was needed to retain the item (King et al., 2010). Ultimately, principal component analysis led to three subscales: ability to work with others, value in working with others, and comfort in working with others. In the initial study, the three subscales of the ISVS accounted for 49% of the variance in responses (King et al., 2010). In addition, Pearson correlation coefficients among the ISVS scales ranged from 0.34 to 0.61 (King et al., 2010). These correlations indicate that the scales capture different aspects of interprofessional socialization. Instrument reliability has also been reported. Inter-item correlation was determined using Cronbach's alpha. The coefficients for each of the three subscales ranged from 0.79 to 0.89 indicating moderate to excellent reliability (King et al., 2010). Other tests of instrument reliability such as parallel forms testing and test-retest stability were not determined.

Multiple studies have been conducted using the 24 item, 3 subscale tool (Cartwright, Franklin, Forman, & Freegard, 2015; De Vries, Woods, Fulton, & Jewell, 2016; LaRochelle & Karpinski, 2016; O'Brien, McCallin, & Bassett, 2013; Hoti, Formon, & Hughes, 2014; Rossler, Buelow, Thompson, & Knofczynski, 2017; Stubbs et al., 2017). The tool was originally validated with health profession students. Recent studies have expanded use of the ISVS beyond health science students to evaluate the beliefs, behaviors, and attitudes about interprofessional practice among therapy professionals (De Vries et al., 2016).

The developers of the ISVS have refined the originally published version of the ISVS. The originally developed and published ISVS was a 24-item tool (King et al., 2010). A graded response model (GRM) based on item response theory (IRT) was used

to re-test items in the original unpublished ISVS-34 questionnaire (King, Orchard, Khalili, & Avery, 2016). The modeling yielded a revised 21-item ISVS that is appreciably different than the previously developed ISVS-24 (King et al., 2016). The most recent subsequent studies using the ISVS have continued to use the ISVS-24, the tool used in this research study.

Participants

The research subjects in the current study were health professional students enrolled in an online Interdisciplinary Palliative Care course. The online Interdisciplinary Palliative Care course is offered both fall and spring semesters at a large, urban, research university in the Midwest. The fall and selected sections of the spring semester were open to students from a variety of programs of study. Students can include pre-medicine, physical therapy, physician assistant, religious studies, and social work. The spring semester offering of the course enrolls a large number of nursing students as part of their required program of study.

The results include 166 participants over eight semesters as shown in Table 1. Of the 166 participants, 57 students (34.3%) completed both the pre and post course ISVS. One hundred and forty-one students (84.9%) completed the pre ISVS and 82 completed the post ISVS (49%). Study participants were predominantly female 141 (84.9%) with 5 male participants (3%). For 20 students (12%), the gender was not reported. Study participants included 138 undergraduates (83.1%) and three graduate students (2%). The undergraduate/graduate status was unknown for 25 students (15%).

Study participants represented 14 different programs of study with the majority coming from nursing. There were 10 speech pathology students (6%), 11 physician

assistant students (6.6%), 109 nursing students (65.7%), 2 pre-dental students (1.2%), 1 student from communication studies (0.6%), 5 psychology students (3%), 3 biomedical studies students (1.8%), 2 students in public health (1.2%), and 1 student each from pre-med, accounting, Spanish, physical therapy, health studies, and criminology. Seventeen students (10.2%) did not report their program of study.

Students participated in one of two cohorts: mixed discipline and nursing student only class sections. One hundred and fifteen students (69.3%), including 58 nursing students participated in the mixed discipline class sections while 51 nursing students (30.7%) participated in the nursing student only class sections.

Intervention

Due to the large course enrollment, select section(s) of the course included only nursing students. Therefore, the course sequencing offered a unique design opportunity to investigate how delivering content on collaborative team health care delivery to mixed or single discipline cohorts affects IS. All student members of the mixed discipline and nursing only cohorts in the selected semesters were recruited to participate in the research project.

The primary course faculty member who teaches the multi-discipline fall section oversaw all course sections, ensuring consistency of course content and intervention fidelity. The course curriculum was originally grant funded through the National Institute of Health (NIH), National Cancer Institute and corresponds with End-of-Life Nursing Education Consortium (ELNAC) competencies. The course faculty members supported this research project and were committed to ensuring intervention fidelity to all learner groups.

The purpose of the Palliative Care course was to provide an understanding of the breadth and depth of palliative care practices and services available to caregivers, patients, and their families. Course objectives were to describe palliative care, including its history, tenets, ethical and legal issues, practice self-reflection as it relates to palliative and end of life care, evaluate the importance of effectively working in teams in palliative care, demonstrate through case discussion complex decision-making skills in palliative care, and to identify opportunities to use palliative care approaches in the student's discipline or practice area. The course was offered in a Web-based format.

Following approval by the Institutional Review Board, students were notified of the opportunity to participate in the research project via course announcements, postings and/or email communication. An online form was created to deploy the ISVS survey to students. Separate online ISVS survey links were provided to members of the nursing student only section(s) and the mixed discipline section(s) to ensure separation of data. Access to edit the online survey or view student results was password protected. At the onset of the course, an outside link to the research project was posted on the course website. The link to the online survey was available only on the course website to ensure that only students who were participating in the course had access to complete the survey. The link contained additional information on the research project including informed consent and researcher contact information. Students were informed that completion of the survey indicated consent to participate and participants had the option to opt out of inclusion in the research project. Participants created a unique identifier used by the creators of the ISVS to link individual participants' pre and post survey data.

Steps were employed to address possible withdrawal bias associated with longitudinal studies. Participants were contacted again at the end of the course to complete the post-survey. Reminders to complete the post-survey included course announcements, postings, and/or email communication. Instrument deployment, instructions, and questions were consistent with the pre-test administration as described above.

Procedure

Initial review of descriptive statistics for the data indicated there were missing data in the data set. Research data that involve human subjects is prone to contain an element of missing data. This is particularly common when self-report measures are used for data collection (Penny & Atkinson, 2011), as is the case in this study. Traditionally, a common strategy for dealing with missing data has been excluding cases (Baraldi & Enders, 2010). Listwise deletion can be advantageous because it yields a complete data set. Complete data sets lend themselves to standard statistical analyses.

Modern missing data techniques are recommended in lieu of excluding cases (Baraldi & Enders, 2010; Penny & Atkinson, 2011; Graham, 2009). Multiple imputation is a preferred modern missing data technique because it produces unbiased estimates (Baraldi & Enders, 2010). Estimates of the means and covariances are used to construct a set of regression equations that predict the missing variables from the complete variables (Baraldi & Enders, 2010). Furthermore, multiple imputation uses a number of filled-in data sets to account for the uncertainty in the missing data (Baraldi & Enders, 2010).

Multiple imputation can be performed at the item or scale level. In this analysis, multiple imputation was performed at the item-level. Choice of imputation approach has

been shown to have no influence on the bias of scale-level parameter estimates (Gottschall, West, & Enders, 2012). Choice of item versus scale level imputation however, can have a substantial impact on efficiency (Gottschall et al., 2012). Item-level imputation produces a meaningful power advantage over scale level imputation estimates (Gottschall et al., 2012). In addition, consultation with a biostatistician yielded a recommendation for modifying the data analysis plan to include modern missing data analysis methods, specifically multiple imputation.

Data analysis included path analysis, a form of structural equation modeling, with change score modeling. Path analysis involves specification and depiction of path models or structural models to depict the relationship between observed variables (Kline, 2015). The path model used in this data analysis is depicted in figure 1.

Latent change score modeling is a technique to study change and time-sequential associations across individuals (Grimm, Ram, & Estabrook, 2017). This study lends itself to understanding within-person change and latent change score models emphasize within-person change (Grimm et al., 2017). Latent change score models make time-dependent change the outcome of interest. The latent change scores are created by paths between the repeated measures of the ISVS tool. In this study, the null hypothesis was that the change score between pre and post course ISVS is zero, indicating that no change had taken place.

Results

The first research question was: Does participating in an educational session that includes teamwork and collaboration principles improve students' IS? The hypothesis was that students will demonstrate greater IS after learning teamwork and collaboration

principles. Students from both groups did increase mean ISVS scores from pre (*M*=4.925, *standard error [SE]*=0.042) to post test (*M*=5.293, *SE*=0.047), change score (*M*=0.368, *V*=0.256, *p*<.001). Cohen's *d*, a measure of effect size was 0.729 as shown in Table 2. On the first subscale, self-perceived ability to work with others, student means scores increased (*M*=5.109, *SE*=0.052) to post test (*M*=5.443, *SE*=0.061), change score (*M*=0.334, *V*=0.329, *p*<.001) with a Cohen's *d*=0.583. The second subscale value in working with others also demonstrated an increase for all students pre (*M*=5.016, *SE*=0.057) to post test (*M*=5.392, *SE*=0.063), change score (*M*=0.376, *V*=0.356, *p*<.001) with a Cohen's *d*=0.631. The final subscale comfort in working with others reflected a statistically significant increase pre (*M*=4.512, *SE*=0.063) to post test (*M*=4.919, *SE*=0.072), change score (*M*=0.407, *V*=0.457, *p*<.001) with a Cohen's *d*=0.606. For every one the effect size (Cohen d) represents a medium to large effect.

The second research question was: Does a mixed-discipline group of students demonstrate greater improvement in IS compared to a single discipline group of students? The hypothesis was that mixed-discipline students will demonstrate greater improvement in IS compared to a single discipline student group. The results from individual groups showed that students who participated in the mixed discipline cohort demonstrated a statistically significant increase in ISVS from pre (*M*=4.972, *SE*=0.046) to post test (*M*=5.291, *SE*=0.054), change score (*M*=0.319, *V*=0.250, *p*<.001) as shown in Table 3. Students who participated in the nursing student only cohort also demonstrated a statistically significant increase in ISVS from pre (*M*=4.820, *SE*=0.074) to post test (*M*=5.299, *SE*=0.081), change score (*M*=0.479, *V*=0.251, *p*<.001). The change score analysis demonstrated that there was no statistically significant difference between the

change in ISVS from pre to posttest between the two groups (*M*=-0.160, *V*=0.097, *p*=0.100) with Cohen's *d*=-0.317.

The scores on subscales were also analyzed by groups. Students in the mixed discipline group showed statistically significant increases on all three subscales. The first subscale self-perceived ability to work with others increased pre (*M*=5.146, *SE*=0.057) to post test (*M*=5.437, *SE*=0.068), change score (*M*=0.291, *V*=0.315, *p*<.001). The second subscale value in working with others increased pre (*M*=5.029, *SE*=0.064) to post test (*M*=5.376, *SE*=0.072), change score (*M*=0.347, *V*=0.360, *p*<.001). The third subscale comfort in working with others increased pre (*M*=4.625, *SE*=0.073) to post test (*M*=4.945, *SE*=0.081), change score (*M*=0.320, *V*=0.449, *p*<.001).

Students who participated in the nursing student only cohort demonstrated statistically significant increases across all three subscales as well. The first subscale self-perceived ability to work with others increased pre (*M*=5.027, *SE*=0.094) to post test (*M*=5.459, *SE*=0.107), change score (*M*=0.432, *V*=0.350, *p*<.001). The second subscale value in working with others also demonstrated statistically significant increase pre (*M*=4.987, *SE*=0.101) to post test (*M*=5.429, *SE*=0.107), change score (*M*=0.442, *V*=0.346, *p*<.001). The final subscale comfort in working with others increased pre (*M*=4.258, *SE*=0.092) to post test (*M*=4.862, *SE*=0.120) change score (*M*=0.604, *V*=0.436, *p*<.001).

Change score analysis was conducted to determine if there was a statistically significant difference between the mixed discipline and nursing student only cohorts on each of the three subscales. The difference between groups on subscale one, self-

perceived ability to work with others was not statistically significant (*M*=-0.142, *V*=0.127, *p*=0.264) with Cohen's *d*=-0.213.

Subscale two, value in working with others also did not show a statistically significant difference between groups (*M*=-0.95, *V*=0.129, *p*=0.463) with Cohen's *d*=-0.172.

The third subscale comfort in working with others showed that the nursing group had a statistically significant improvement from pre to post-test when compared to the mixed discipline group (*M*=-0.284, *V*=0.145, *p*=0.05) with Cohen's *d*=-0.437.

Discussion

IS prepares health science students to perform on high functioning healthcare teams. Health care students from all disciplines need to be prepared to engage in collaborative, team-based health care because health team communication and collaboration impact patient outcomes. This study affirms that the value health science students' place on teamwork and collaboration can be positively impacted by well-designed and delivered instructional content.

Students demonstrated a statistically significant increase in IS when all participants were examined together as well as when broken down into individual nursing and mixed discipline cohorts. Cohen's d gives a measure of magnitude of the change pre to post ISVS. The test for the difference between two independent means pre and post ISVS can be described in terms of small .2, medium .5, or large .8 (Cohen, 1992). When examining all students, a medium effect size is seen (0.729). A medium effect size represents an effect likely to be visible to the naked eye of a careful observer (Cohen, 1992). Transformative learning of medium effect size shifts students' values and

identities. Socialization to collaborative teamwork has the power to transform assumptions and worldviews and enhance students' knowledge and skills concerning interprofessional practice. Therefore, thoughtful coursework on teamwork and collaboration can increase student IS markedly with the potential to improve collaborative practice impacting patient outcomes.

A statistically significant change from pre to post ISVS was demonstrated in both the nursing student only and mixed discipline cohorts. The effect size for students in the mixed cohort was medium (0.639), where the effect size when examining students in the nursing only cohort was large (0.960). Part of the effect size difference seen between the two groups may be due to a higher pre ISVS in the mixed discipline cohort, indicating that nursing students had more room to grow in IS.

Indeed, the gains seen in increased IS continue when examining each subscale of the ISVS. When analyzing all students by subscale, there were statistically significant increases in pre to post self-perceived ability to work with others, value in working with others, and comfort in working with others. The effect size was medium for each of the subscales (0.583, 0.631, 0.606). When examined as a whole, statistically significant increases in IS of medium effect size were demonstrated in each of the subscales.

Additional insight in between group changes and differences can be illuminated by examining the subscales in each cohort. Increases in ISVS pre to post course were statistically significant for self-perceived ability to work with others, value in working with others, and comfort in working with others in the mixed discipline cohort with medium effect sizes in self-perceived ability to work with others (0.518) and value in working with others (0.579) and a small effect size (0.478) in comfort in working with

others. Similarly, in the nursing only cohort, students demonstrated medium-to-large effect sizes in self-perceived ability to work with others (0.731) and value in working with others (0.579) and a medium effect size (0.478) in comfort in working with others.

The second aim of the study was to determine if there was a difference in IS changes between mixed discipline and nursing student only cohorts of students. Examining the second aim of this study by IS subscale we see there was a statistically significant change score between groups on subscale three, comfort in working with others (-0.284, p=0.050). The data indicated that rather than the mixed discipline cohort demonstrating greater gains, the nursing student only cohort demonstrated greater improvement in comfort in working with others compared to their mixed discipline peers.

The theorized benefit of increased IS when learning with interdisciplinary students compared to a nursing student only cohort was not demonstrated in this study. Research highlighting the importance of the timing, duration and relevance of IPE in promoting behavior changes among individual health professionals may illuminate some potential reasons there was no difference in change score between groups on the overall ISVS (Frenk et al., 2010). The nursing student only cohort of participants completed the research study and associated course in the final semester prior to graduation. They were concurrently enrolled in their fourth and final clinical placement experience making the timing of the teamwork and collaboration content particularly relevant to their development and occurring at a salient point in their educational progression. In addition, when examining the ISVS subscales, students in the nursing only cohort showed the largest effect size in the area of self-perceived ability to work with others (0.731). This subscale may have been positively increased in the nursing students' ability to

concurrently apply coursework to their clinical setting. Nursing students also have their leadership course in senior year, so may have had additional learning contributing to their increased scores through the leadership course as well as interprofessional practice in clinical settings. Therefore, course sequencing may contribute in part to the large improvement seen in IS and large effect size in this cohort of students.

Comparatively, students in the mixed discipline cohort could have enrolled in the research study and associated palliative care course at any point in their educational progression and may not have been concurrently enrolled in clinical placement experiences. Though still demonstrating a statistically significant improvement, this may have contributed to the smaller increase in IS and relatively smaller effect size compared to the nursing student only cohort.

A second possible consideration impacting this study could be program size for individual health profession programs. The nursing program is the largest undergraduate health profession program at the university. Numerous IPE initiatives are concurrently underway across health training programs. Therefore, a nursing student coming from the large student class may have relatively less prior IPE experience than students in other health profession programs leading to a larger room to grow and accounting for the larger relative effect size seen in the nursing student cohort. The demographic data obtained on students did not explicitly ask for prior experiences in IPE so this could not be measured in the current study data.

Limitations.

One potential limitation of the research study is intervention fidelity. The research project was conducted across different semesters, instructors, and sections of the course.

Every effort was made to ensure intervention fidelity between the separate semesters and sections of instruction within the Palliative Care course.

Another limitation is intervention generalizability. There are some anticipated limits to the ability to generalize findings from this study to general IPE work. IPE modules can vary widely in the content delivered and, similar to this proposal, imbed teamwork, communication, and collaboration training within the context of specialty specific content. Therefore, the ability to generalize to other interprofessional training within the context of a different specialty area may be limited.

An additional limitation of the research study was that race was not included as a demographic variable. Subsequent research has concluded that are statistically significant differences between races on measures of interprofessional socialization and communication apprehension (LaRochelle & Karpinski, 2016). Racial differences in interprofessional collaborations need to be considered and further explored and race should be included in the demographic data of future studies in interprofessional socialization to facilitate this discourse.

It is also important to note that this was an entirely online course. Results could differ for other learning experiences, such as simulation, in person or hybrid. Research has demonstrated small scale efficacy of online IPE (Cartwright et al., 2016; McKenna et al., 2014). More broadly, analysis of outcomes of IPE using information and communication technologies (ICTs) has been conducted (Curran et al., 2015). ICTs were defined as technologies and resources used in IPE to create, communicate, disseminate, and manage information demonstrate that learners react favorably to the use of information and communication technologies. Analysis demonstrated that learners react

favorably to the use of ICTs in the delivery of IPE, and ICT-mediated IPE has led to positive changes in attitude and knowledge (Curran et al, 2015). However, further research is needed to determine how different learning experiences such as simulation, in-person, or hybrid affect student IS outcomes comparatively.

Concluding Comments

A challenge to substantiating the value of IPE has been a limited number of studies that assess the effectiveness of IPE interventions compared to education interventions in which the same professions were learning separately from one another. Instead, IPE has been deemed effective with IPE interventions compared to control groups which received no educational intervention. This study measured the differences in student IS between an IPE cohort and a usual care group of one-discipline learners. Though no difference in outcome was seen between the two groups in this study, further research is needed to compare mixed discipline versus single discipline learning in other formats such as fully in person learning.

Despite limitations, this study offers insights into students' value of the contributions and role of interprofessional team members. Notably, training on teamwork and collaboration in this research study was online and effective. Most importantly, the study demonstrates that IS can be significantly increased through well designed learning in teamwork and collaboration whether students participate with single discipline peers or mixed discipline settings. Though no difference was observed between a cohort of nursing student only learners versus a cohort of mixed discipline students, statistically significant increases in IS were seen with all participants, in individual cohorts and in all IS subscales both with all participants and individual cohorts. IS facilitates the

development of positive, collaborative interprofessional communication and relationships amongst the healthcare team. The increased IS demonstrated in this study has the potential to positively impact healthcare delivery and patient safety. As such, the attributes of IS should be included in the design of health care student education strategies to ultimately improve the functioning of health care teams.

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Table 1. Descriptive statistics

	Number	Percentage
Total Participants	166	100
Completed Pre & Post	57	34.3
Completed Pre	141	84.9
Completed Post	82	49
Gender		
Male	5	3
Female	141	84.9
Unknown	20	12
Program of Study		
Undergraduate	138	83.1
Graduate	3	2
Unknown	25	15
Intended Major		
Speech Pathology	10	6
Physician Assistant	11	6.6
Nursing	109	65.7
Pre-Dental	2	1.2
Communication Studies	1	0.6
Psychology	5	3
Biomedical Studies	3	1.8
Public Health	2	1.2
Pre-Med	1	0.6
Accounting	1	0.6
Spanish	1	0.6
Physical Therapy	1	0.6
Health Studies	1	0.6
Criminology	1	0.6
Unknown	17	10.2
Cohort		
Mixed	115	69.3
Nursing	51	30.7

Table 2. Research Question (RQ) 1 Results

	ISVS scores (* indicates statistically significant)	Cohen's D
RQ1 All students	Pre *M*=4.925, *SE*=0.042 to post-test *M*=5.293, *SE*=0.047 Change score: *M*=0.368, *V*=0.256, *p*<.001*	0.729
RQ1 All students by subscale	Ability to work with others Pre *M*=5.109, *SE*=0.052 to post-test *M*=5.443, *SE*=0.061 Change score: *M*=0.334, *V*=0.329, *p*<.001* Value working with others Pre *M*=5.016, *SE*=0.057 to post-test *M*=5.392, *SE*=0.063 Change score: *M*=0.376, *V*=0.356, *p*<.001* Comfort working with others Pre *M*=4.512, *SE*=0.063 to post-test *M*=4.919, *SE*=0.072 Change score: *M*=0.407, *V*=0.457, *p*<.001*	0.583 0.631 0.606
RQ1 By Cohort	Mixed Pre *M*=4.972, *SE*=0.046 to post-test *M*=5.291, *SE*=0.054 Change score: *M*=0.319, *V*=0.250, *p*<.001* Nursing Pre *M*=4.820, *SE*=0.074 to post-test *M*=5.299, *SE*=0.081 Change score: *M*=0.479, *V*=0.251, *p*<.001*	
Mixed By Subscale	Ability to work with others Pre *M*=5.146, *SE*=0.057 to post-test *M*=5.437, *SE*=0.068 Change score: *M*=0.291, *V*=0.315, *p*<.001* Value working with others Pre *M*=5.029, *SE*=0.064 to post-test *M*=5.376, *SE*=0.072 Change score: *M*=0.347, *V*=0.360, *p*<.001* Comfort working with others Pre *M*=4.625, *SE*=0.073 to post-test *M*=4.945, *SE*=0.081 Change score: *M*=0.320, *V*=0.449, *p*<.001*	

Nursing By Subscale	Ability to work with others Pre *M*=5.027, *SE*=0.094 to post-test *M*=5.459, *SE*=0.107 Change score: *M*=0.432, *V*=0.350, *p*<.001* Value working with others Pre *M*=4.987, *SE*=0.101 to post-test *M*=5.429, *SE*=0.107 Change score: *M*=0.442, *V*=0.346, *p*<.001* Comfort working with others Pre *M*=4.258, *SE*=0.092 to post-test *M*=4.862, *SE*=0.120 Change score: *M*=0.604, *V*=0.436, *p*<.001*	

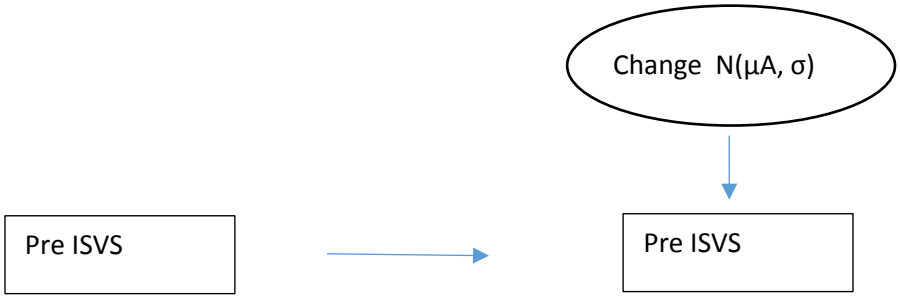
Table 3. RQ 2 Results

RQ2 Between Groups	Change score: *M*=-0.160, *V*=0.097, *p*=0.100	-0.317
RQ2 By Subscale	Ability to work with others Change score: *M*=-0.142, *V*=0.127, *p*=0.264 Value working with others Change score: *M*=-0.95, *V*=0.129, *p*=0.463 Comfort working with others Change score: *M*=-0.284, *V*=0.145, *p*=0.05*	-0.213 -0.172 -0.437

Figure 1. Path analysis diagram

Research Question 1

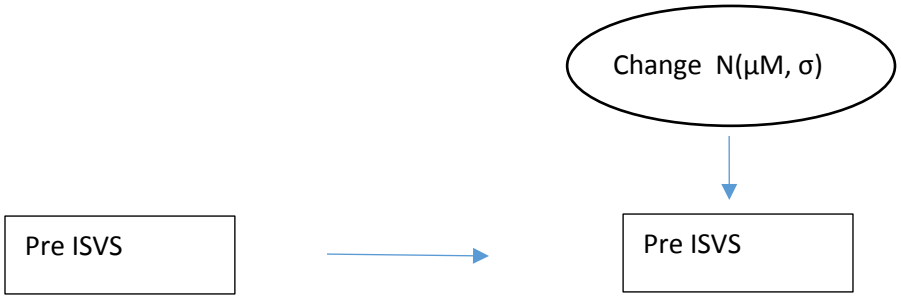
All



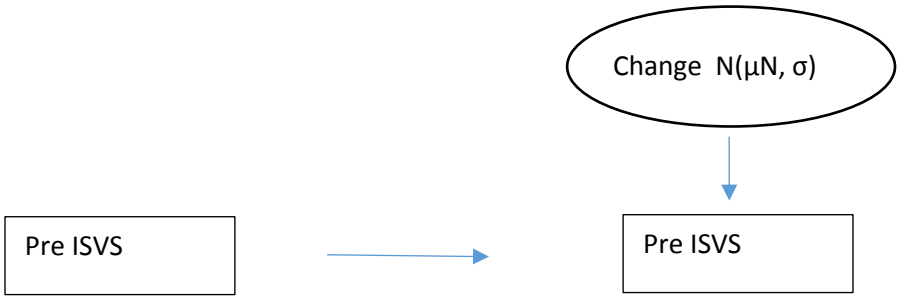
Null $\mu_A = 0$

Research Question 2

Mixed



Nursing



Null $\mu_M = \mu_N$

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Interprofessional Socialization and Valuing Scale

Introduction

This instrument is designed to help you explore your perceptions of what you have learned about working with professionals from other disciplines. Please complete the following questionnaire based on your own views of your experiences (through workshops, classes, or practice).

Please **indicate the degree to which you hold or display each of the beliefs, behaviours, and attitudes** that are described. You are asked to consider ***where you feel you are now***.

You are asked to respond to each statement using a 7-point scale with 1 meaning "Not at All" and 7 meaning "To a Very Great Extent". Please respond by circling the **one** number that you feel best fits your experience. If you feel the statement does not apply to you please use the zero value (0).

At this point in time, based on my participation in interprofessional education activities and/or clinical practice…	**To a Very Great Extent**	**To a Great Extent**	**To a Fairly Great Extent**	**To a Moder-ate Extent**	**To a Small Extent**	**To a Very Small Extent**	**Not at All**	**N/A**
1. I feel confident in taking on different roles in a team (i.e. leader, participant)	7	6	5	4	3	2	1	0
2. I am comfortable debating issues within a team	7	6	5	4	3	2	1	0
3. I more highly value open and honest communication with team members	7	6	5	4	3	2	1	0
4. I am able to listen to other members on a team	7	6	5	4	3	2	1	0
5. I have gained a better understanding of my own approach to care within an interprofessional team	7	6	5	4	3	2	1	0
6. I believe that interprofessional practice is *not* a waste of time	7	6	5	4	3	2	1	0
7. I am able to share and exchange ideas in a team discussion	7	6	5	4	3	2	1	0

At this point in time, based on my participation in interprofessional education activities and/or clinical practice…	To a Very Great Extent	To a Great Extent	To a Fairly Great Extent	To a Moder-ate Extent	To a Small Extent	To a Very Small Extent	Not at All	N/A
8. I feel comfortable being the leader in a team situation	7	6	5	4	3	2	1	0
9. I feel comfortable in speaking out within the team when others are not keeping the best interests of the client in mind	7	6	5	4	3	2	1	0
10. I see myself as preferring to work on an interprofessional team	7	6	5	4	3	2	1	0
11. I believe that interprofessional practice will give me the desire to remain in my profession	7	6	5	4	3	2	1	0
12. I have gained an enhanced awareness of roles of other professionals on a team	7	6	5	4	3	2	1	0
13. I have gained an appreciation for the importance of having the client and family as members of a team	7	6	5	4	3	2	1	0
14. I feel comfortable in being accountable for the responsibilities I have taken on	7	6	5	4	3	2	1	0
15. I am comfortable engaging in shared decision making with clients	7	6	5	4	3	2	1	0
16. I feel comfortable in accepting responsibility delegated to me within a team	7	6	5	4	3	2	1	0
17. I have gained a better understanding of the client's involvement in decision making around their care	7	6	5	4	3	2	1	0

At this point in time, based on my participation in interprofessional education activities and/or clinical practice…	**To a Very Great Extent**	**To a Great Extent**	**To a Fairly Great Extent**	**To a Moder-ate Extent**	**To a Small Extent**	**To a Very Small Extent**	**Not at All**	**N/A**
18. I feel comfortable clarifying misconceptions with other members of the team about the role of someone in my profession	7	6	5	4	3	2	1	0
19. I have gained greater appreciation of the importance of a team approach	7	6	5	4	3	2	1	0
20. I feel able to act as a fully collaborative member of the team	7	6	5	4	3	2	1	0
21. I feel comfortable initiating discussions about sharing responsibility for client care	7	6	5	4	3	2	1	0
22. I believe that interprofessional practice is difficult to implement	7	6	5	4	3	2	1	0
23. I have gained more realistic expectations of other professionals on a team	7	6	5	4	3	2	1	0
24. I have gained an appreciation for the benefits in interprofessional team work	7	6	5	4	3	2	1	0

Please assist us in knowing information about you that will help in determining whether there are any relationships between previous experience/knowledge and interprofessional education.

1.0 My current designation would be: ***Please check one box.***

1.0.1 ☐ I am a student 1.0. 2 ☐ I am a Clinician 1.0.3 ☐ I am student with program practice experience

If you checked the box in 1.0.2 or 1.0.3, please answer the following (check all boxes that apply):

My program practice experience has included:

1.0.4 ☐ community agency care 1.0.5 ☐ acute care

1.0.6 ☐ out-patient care 1.0.7 ☐ rehabilitative care

1.0.8 ☐ home care 1.0.9 ☐ family health team care

1.0.10 ☐ other: Please describe _____

1.1 Have you participated in Interprofessional Education (IPE) Workshops provided through UWO? ☐ YES ☐ NO

If you answered YES to 1.1, please identify how many you have attended:

1.1.1 ☐ 1 workshop 1.1.2 ☐ 2 workshops 1.1.3 ☐ 3 workshops

1.1.4 ☐ 4 workshops 1.1.5 ☐ 5 workshops 1.1.6 ☐ 6 workshops

1.1.7 ☐ 7 workshops 1.1.8 ☐ 8 workshops 1.1.9 ☐ more than 8 workshops

If you answered NO to 1.1, please indicate whether you have attended any IPE workshops outside of UWO:

☐ YES ☐ NO

If you are a student, please answer 1.2. If you are a clinician, please skip to 1.3.

1.2 I am a student in a health program and have participated in an Interprofessional Group practice placement:

☐ YES ☐ NO

If you responded YES to this question, please identify the number of placements you have experience with:

1.2.1 ☐ 1 placement on a team 1.2.2 ☐ 2 placements on teams

1.2.3 ☐ 3 placements on teams 1.2.4 ☐ 4 or more placements on teams

1.3 I am a health practitioner and have experience working on teams: ☐ YES ☐ NO

If you responded YES to 1.3, please complete the next section:

The length of my experience in working on teams is:

1.3.1 ☐ 1-3 years 1.3.2 ☐ 4-6 years

1.3.3 ☐ 7-10 years 1.3.4 ☐ more than 10 years

1.4 The heath/social service practitioner group I either study in or practice as is:

1.4.1 ☐ Audiology 1.4.2 ☐ Clinical Kinesiology 1.4.3 ☐ Dentistry

1.4.4 ☐ Dietetics 1.4.4 ☐ Medicine 1.4.5 ☐ Nursing (RN)

1.4.6 ☐ Nursing (RPN) 1.4.7 ☐ Occupational Therapy 1.4.8 ☐ Personal Care Worker

1.4.9 ☐ Physical Therapy 1.4.10 ☐ Pre-Professional Program: (Bachelor of Medical or Health Sciences, Kinesiology, Pre-Social Work)

1.4.11 ☐ Psychiatry 1.4.12 ☐ Psychology 1.4.13 ☐ Social work

1.4.14 ☐ Speech Language Pathology 1.4.15 ☐ Other: *Please state* _____

1.5 My gender is: ☐ Male ☐ Female

Thank you for taking the time to complete this instrument.

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August 12, 2015

Ms. Kara Groom
Nursing

Dear Ms. Groom:

Thank you for submitting your protocol number HR-3030 titled, "*Comparing interprofessional socialization in nurse-centric and mixed discipline cohorts*" to the Office of Research Compliance (ORC). On August 12, 2015, a determination of exempt status was made under the following category or categories:

- Category #2: Educational Tests, Surveys, Interviews, or Observations

Your protocol has been granted exempt status as submitted. Before proceeding with your research, you may be required to adhere to other MU policies, and state and federal laws governing activities you seek to employ. Visit ORC's website (http://www.marquette.edu/orc/irb/policies.shtml) for an inconclusive list of related links which are independent of MU IRB review/approval.

Minor changes to the project may be emailed to orc@mu.edu. Major changes, or changes affecting participant risk, require submission of a Protocol Amendment Form which can be found on the ORC web site. These changes must be reviewed and approved by the IRB before being initiated, except when necessary to eliminate apparent immediate hazards to the human subjects. If there are any adverse events, please notify the Marquette University IRB immediately.

Please submit an IRB Final Report Form once this research project is complete. Submitting this form allows the Office of Research Compliance to close your file.

Contact the IRB office if you have any further questions. Thank you for your cooperation and best wishes for a successful project.

Sincerely,

Benjamin Kennedy
Research Compliance Officer-Human Subjects & Radiation Safety

cc: Dr. Marilyn Frenn

BK/tk